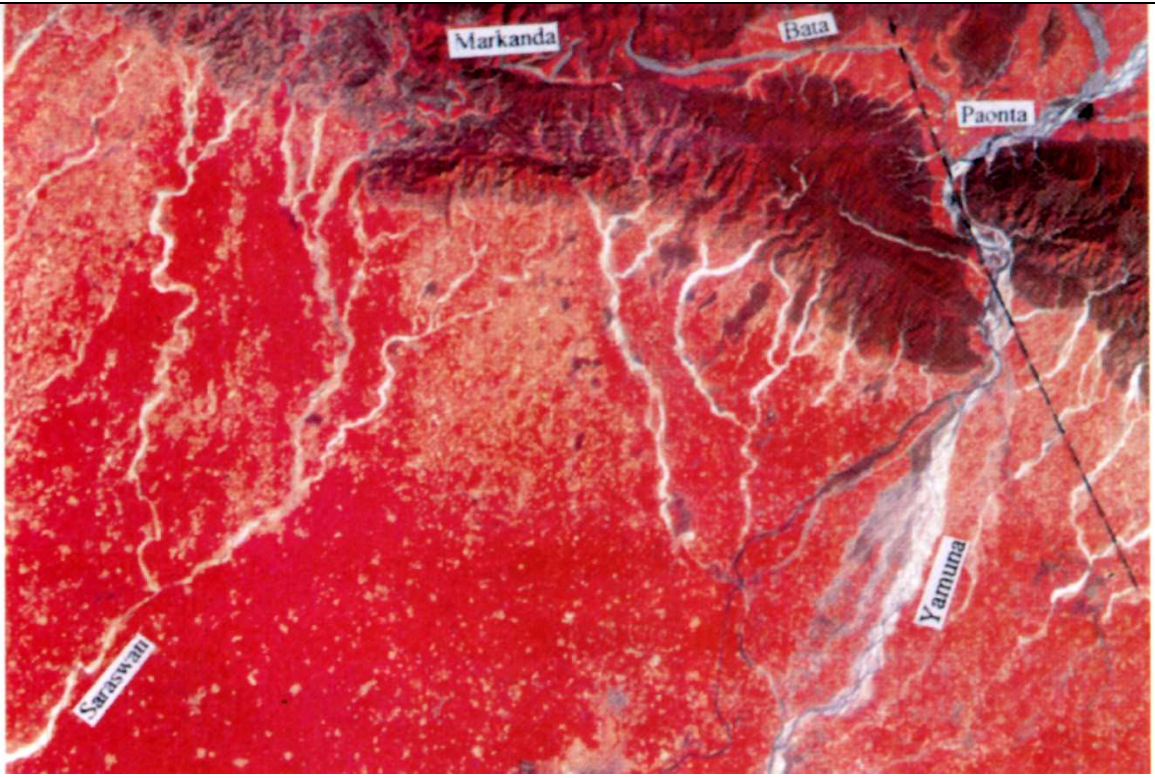
SARASVATI:
Vedic river and Bharatiya civilization



Siwalik hills were left-laterally displaced. NNW-SSE-trending tear fault is still active. The earlier west-flowing rivers were swung southwards, following the path of the fault. The Bata stream which joins Yamuna from the west has a very wide valley. [NRSA, ISRO, Hyderabad]

Dr. S. Kalyanaraman
Babasaheb (Umakanta Keshav) Apte Smarak Samiti,
Bangalore 2004

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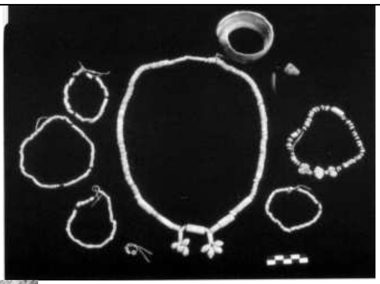
SARASVATI:
Vedic river as a scientific reality, roots of Bharatiya culture



Burial ornaments made of shell and stone disc beads, and *turbinella pyrum* (sacred conch, s'an:kha) bangle, Tomb MR3T.21, Mehrgarh, Period 1A, ca. 6500 BCE. The nearest source for this shell is Makran coast near Karachi, 500 km. South. [After Fig. 2.10 in Kenoyer, 1998].

ham indram atus.t.avam
s.ati brahmedam bha_ratam

) RV 3.053.12 I have made Indra
heaven and earth, and this prayer
s the race of Bharata. [Made Indra
.t.avam-- the verb is the third
I have caused to be praised; it may
mean: I praise Indra, abiding between heaven and earth, i.e. in the firmament].

As early as R.gveda, r.s.i Gr.tsamada sees Sarasvati in three forms: ambi, nadi, devi (mother, river, devi): ambitame naditame devitame sarasvati. (RV 2.41.16)

Bronze foot and bronze anklet: Mohenjo-daro [After fig. 5.11 in: DP Agrawal, 2000]

Presiding deity of Vidya_-mandira established by Bhoja, the ruler of Parama_ra dyanasty of Dha_ra_, Ma_lawa (who reigned from 1018-10060 A.D. The king is said to have founded a Sanskrit College within the temple dedicated to Sarasvati_.) Now displayed as Stuart Bridge Collection (No.84); British Museum. Parama_ra, 1034 A.D. with a late na_gari inscription. She is standing in tribhanga pose, is bejewelled; has four arms; a garland is held in her left upper hand and a manuscript is held in her left lower hand. Five ji_nas are carved seated on the upper part of the black slab; an apparent indication that the image depicts the Jaina goddess of learning. On the base are two female attendants and a squatting worshipper on either side; to the right, a male and to the left, a female, perhaps representing the donors. The base of the image has an inscription in na_gari mentioning that it was made by the sculptor Manthala in 1034 A.D. She is stated to be the protectress of the sixth Ti_rtha_nkara Padmaprabha. The eight anklets worn on her two ankles are reminiscent of the anklets worn by the bronze image unearthed in Mohenjo-daro dated ca. 2750 B.C.

Dr. S. Kalyanaraman
Bangalore 2004

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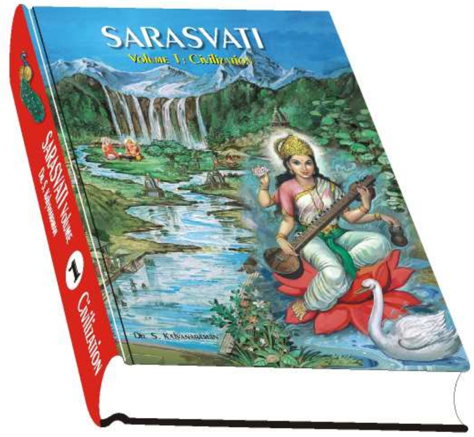
Author's Preface

This is a tribute to the memory of the late Pujaniya Moropant Pingle and the late Padmashri Dr. Vakankar who led a team of scholars in search of Vedic River Sarasvati after performing a yajna at Adi Badri in 1982. This search gathered momentum with scientists of a number of disciplines getting involved in the quest. Today, a Sarasvati Sarovar stands in the place where the yajna was performed and the Sarasvati River attested in Survey of India maps, toposheets and village revenue records is a flowing reality upto Pehoa (referred to as Pruthudaka in Mahabharata, as a pilgrimage site visited by Shri Balarama, elder brother of Shri Krishna).

The re-discovery of Vedic river Sarasvati and the rebirth of River Sarasvati in Bharat are two historical events which transform our understanding of the roots of Bharatiya culture and civilization and the scientific temper exemplified by the very word, Veda, which is derived from the root, vid- 'to know'.

An encyclopaedic work was published in 2003 in the following 7 books, authored by Dr. S. Kalyanaraman, as a tribute to Pujaniya Babasaheb (Umakanta Keshav) Apte, who yearned for study of Bharatiya itihasa based on bharatiya ethos and traditions and Samskritam sources:



Sarasvati: Civilization; Sarasvati: R.gveda; Sarasvati: River; Sarasvati: Bharati; Sarasvati: Technology; Sarasvati: Language ; Sarasvati: Epigraphs

This work is an abridgement of details provided in: website http://www.hindunet.org/saraswati with over 30,000 files, and the 7 books.

The enduring nature of the culture of the nation has been a source of awe and inspiration for many generations of scholars. It has now been conclusively and scientifically established that Vedic River Sarasvati was a reality in north-western Bharat and that the Bharatiya culture is an indigenously evolved continuum dating back to at least 8500 Before Common Era (BCE).

S'ubha Deepavali.

Dr. S. Kalyanaraman
11 November 2004

S'ubha Deepavali, Kaliyuga Samvat 5106

About the Author

Dr. S. Kalyanaraman has a Ph.D. in Public Administration from the University of the Philippines; his graduate degree from Annamalai

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University was in Statistics and Economics. His PhD dissertation was on development administration, a comparative study of 6 Asian countries, published as *Public Administration in Asia* in 2 volumes.

He was a Senior Executive in the Asian Development Bank, Manila, Philippines for 18 years from 1978 to 1995 responsible for the world-wide IT network of the Bank and disbursements on a portfolio of US$60 million for over 600 projects in 29 developing countries of Asia-Pacific region. Prior to joining the Bank, he was Financial Advisor on the Indian Railways (responsible, as part of a professional team, for introducing computers on the Railways) and Chief Controller of Accounts, Karnataka Electricity Board. He took voluntary retirement from the Bank five years' ahead of schedule and returned to Bharat to devote himself to Sarasvati River researches and development projects.

He is well-versed in many languages of Bharat: Tamil, Telugu, Kannada, Hindi, Sanskrit. He has compiled a comparative dictionary for 25 ancient Indian languages, titled *Indian Lexicon*. He has set up a website on Sarasvati River and Civilization with over 30,000 files (http://www.hindunet.org/saraswati); he is the founder of the yahoogroup, IndianCivilization, which has over 800 members (April 2003). His work, *Sarasvati*, was published in 2001 a compendium on the discovery of Vedic River Sarasvati. The present 7-volume enyclopaedic work on *Sarasvati Civilization* is a result of over 20 years of study and research. He is Director, Sarasvati Nadi Shodh Prakalp, Akhil Bharatiya Itihaasa Sankalana Yojana, Chennai 600015. The Prakalp is engaged in researches related to Sarasvati Civilization and interlinking of national rivers of Bharat.

He has contributed to many scholarly journals and participated in and made presentations in a number of national and international conferences including the World Sanskrit Conference held in Bangalore in 1995. He delivered the Keynote address in the International Conference of World Association of Vedic Studies, 3rd Conference held in University of Massachusetts, Dartmouth, in July 2002. kalyan97@gmail.com

Diacritical marks used

The Kyoto-Harvard convention is NOT used since the intermingling of English words with Indian language words wll distort the representation of capital letters and is not easy to read.

The standard diacritical marks are deployed but, instead of ligaturing them on top and bottom of the alphabet, the diacritical marks FOLLOW immediately after the vowel or consonant which is modified. For e.g., a_ connotes ‘long a’, n. connotes retroflex N. After the UNICODE is standardized, the next edition will display the modified codes for ease of representation on web pages on the internet.

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a r*u*t,*a*t	e b*e*t	d *th*en
a_/ l*aw*	e_ *a*te	d. *d*ot
a~_ l*ong*	e~_ b*an*e	l. riva*lr*y
/a~ *un*-	/e~ wh*en*,*whey*	n. a*n*d
i it	o *o*bese	n- *n*ew
i_ b*ee*	o_ note	r- cu*rl*
i~_ b*een*	o~_ b*one*,*one*	r. *r*ug
/i~ *in*	m. mu*m*	r.. (*zsh*)
u y*ou*	n: ki*ng*	s fu*s*e
u_/ *oo*ze	*n~* *ny*et	s. *sh*ut
u~_ b*oon*	h-/k- w*h*at	s' *s*ugar
/u~ j*un*e	c *ch*ange	t bo*th*
	c. *s*o	t. *t*oo

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List of languages and abbreviations

The languages of the linguistic area and the abbreviations used are as follows:

A.Assamese
Ap.Apabhram.s'a
Ash. Ashkun (As.ku~_--Kafiri)
Aw. Awadhi_
B. Bengali (Ban:gla_)
Bal. Balu_ci_ (Iranian)
Bashg. Bashgali_ (Kafiri)
BCE Before Common Era (BC)
Bel. Belari
Bhoj. Bhojpuri_
Bi. Biha_ri_
Br. Bra_hui_
Brj. Brajbha_s.a_
Bshk. Bashkari_k (Dardic)
Bur.Burushaski
CE Common Era (AD)
Chil. Chili_s (Dardic)
D.. D.uma_ki
Dm. Dame~d.i_ (Kafiri-Dardic)
G. Gujara_ti_
Ga. Gadba
Garh.Gar.hwa_li_
Gau. Gauro (Dardic)
Gaw.Gawar-Bati (Dardic)
Gmb. Gambi_ri_ (Kafiri)
Go. Gondi
Gy. Gypsy or Romani
H. Hindi_
Ir. Irul.a
K. Ka_s'mi_ri_
Ka. Kannad.a
Kaf. Kafiri
Kal. Kalasha (Dardic)
Kand. Kandia (Dardic)
Kat.. Kat.a_rqala_ (Dardic)
Kho. Khowa_r (Dardic)
Khot. Khotanese (Iranian)
Kmd. Ka_mdeshi (Kafiri)
Ko. Kota
Kod.. Kod.agu (Coorg)
Koh. Kohista_ni_ (Dardic)
Kol. Kolami
Kon. Kon:kan.i_
Kond.a
Kor. Koraga
Kt. Kati or Katei (Kafiri)
Ku. Kumauni_
Kui
Kurub.Bet.t.a Kuruba
Kur.Kur.ux (Oraon, Kuru*kh*)
Kuwi
L. Lahnda_
M. Mara_t.hi_
Ma.Malayalam
Mai.Maiya~_ (Dardic)
Malt.Malto
Ma_lw.Ma_lwa_i_
Mand.. Mand.a
Marw.Ma_rwa_r.i_
Md.Maldivian dialect of Sinhalese
MIA Middle Indo-Aryan
Mj. Munji_ (Iranian)
Mth. Maithili_
Mu. Mun.d.a_ri (Munda)
N. Nepa_li
Nahali
Nin:g. Nin:gala_mi (Dardic)
Nk. Naikr.i (dialect of Kolami = LSI, Bhili of Basim; Naiki of Chanda)
OIA Old Indo-Aryan
Or. Or.iya_
P. Punja_bi_ (Paja_bi_)
Pa. Parji
Pali
Pah. Paha_r.i_
Pa_Ku. Pa_lu Kur-umba
Pas'. Pas'ai (Dardic)
Pe. Pengo
Phal. Phalu_r.a (Dardic)
Pkt. Prakrit
S. Sindhi_
Sant. Santa_li_ (Mun.d.a_)
Sh. Shina (S.in.a_.Dardic)
Si. Sinhalese
Sik. Sikalga_ri_ (Mixed Gypsy Language: LSI xi 167)
Skt. Sanskrit
Sv. Savi (Dardic)
Ta.Tamil
Te.Telugu
Tir.Tira_hi_ (Dardic)
To. Toda

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Tor.To_rwa_li_ (Dardic)
Tu. Tulu
U. Urdu
Werch.Werchikwa_r or Wershikwa_r (Yasin dialect of Burushaski)
Wg. Waigali_ or Wai-ala_ (Kafiri)
Wkh. Wakhi (Iranian)
Wot..Wot.apu_ri_ (language of Wot.apu_r and Kat.a_rqala_. Dardic)
WPah. West Paha_r.i

Abbreviations used for linguistic categories and other languages

Languages, Epigraphs	etym. etymology expr.expression
As'. As'okan inscriptions	f./fem. feminine
Austro-as. Austro-asiatic (cf. Munda)	fig. figuratively
BHSkt. Buddhist Hybrid Sanskrit (Franklin Edgerton, Buddhist Hybrid Sanskrit Grammar and Dictionary, Newhaven, 1953)	fr. from fut. future gen. genitive
Dard. Dardic	hon. honorific
Dhp. Ga_ndha_ri or Northwest Prakrit (as recorded in the Dharmapada ed. J. Brough, Oxford 1962)	id. idem (having the same meaning) imper.imperative incl. including
Drav. Dravidian	inf.infinitive
IA. Indo-aryan	inj.injunctive
IE. Indo-european	inscr.inscription
Ind. Indo-aryan of India proper excluding Kafiri and Dardic (as classified by R.L. Turner)	lex. lexicographical works or Kos'as lit. literature
KharI. Kharos.t.hi_ inscriptions; Middle Indo-aryan forms occurring in Corpus Inscriptionum Indicarum Vol. II Pt.I, Calcutta, 1929 MIA Middle Indo-aryan	loc. locative m. masculine M Middle metath. metathesis (of)
NiDoc. Language of 'Kharos.t.hi_ Inscriptions discovered by Sir Aurel Stein in Chinese Turkestan' edited by A.M. Boyer, E.J. Rapson, and E. Senart	N North Na_ Na_ci Na_t.u usage Naut. Nautical nom.nominative
Ar.Arabic	nom.prop. nomen proprium (proper name)
Aram.Aramaic	num.numeral(s)
Arm.Armenian	NWNorth-west
Av. Avestan (Iranian)	O Old
E. English	obl. oblique case
Gk. Greek	onom.onomatopoeic
Goth. Gothic	p. page
Ishk. Ishka_shmi_ (Iranian)	part. participle
Kurd. Kurdish (Iranian)	pass. passive
Lat. Latin	perf. perfect
Lith.Lithuanian	perh. perhaps
OHG. Old High German	phonet.phonetically
Orm. O_rmur.i_ (Iranian)	pl. plural
OSlav. Old Slavonic	pp. past participle (passive)
Par. Para_ci_ (Iranian)	pres. present
Pahl. Pahlavi (Iranian)	pron. pronoun
Pers. Persian (Iranian)	Pudu. Pudukkottai usage

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Port. Portuguese
Pr. Prasun (Kafiri)
Psht. Pashto (Iranian)
Tib. Tibetan
Toch. Tocharian
Turk. Turkish
Yid. Yidgha (Iranian)

Abbreviations : Grammatical

* hypothetical
< (is) derived from
> (has) become
? doubtful
Xinfluenced by
+ extended by
~ parallel with
acc.accusative
adj. adjective
adv. adverb
aor. aorist
caus. causative
cent. century
cf. confer (compare)
cmpd.compound(ed)
com. commentary, t.i_ka_
conj.conjunction
dat. dative
dist.fr.distinct from
du. dual
E East
e.g. example
redup. reduplicated
ref. reference(s)
S South
sb./subst.substantive
semant. semantically
st. stem
subj. subjunctive
syn. synonym
Tinn. Tinnevelly usage
Tj. Tanjore usage
usu. usual(ly)
vais.n..vais.n.ava usage
vb. verb
viz. videlicet (namely)
W West

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Sarasvati River

Sarasvati is Naditame who assumes the *ru_pa* of Ambitame, Devitame

Sarasvati_. The legend shown on Bhita sealing, together with a ghat.a. Indian Museum, Calcutta No. A. 11254-NS. 1958 The association of Sarasvati_ with a ghat.a, water-pot is significant and relates to River Sarasvati_.

Skanda Pura_n.a describes the course of the Saravati_ River. Sarasvati_ issues from the water-pot of Brahma_ (1.ii.56.13; 3.ii.25.1-7, 10-16, hence called Brahman.ahsuta_: 3.ii.25.7) and flows on a downward course from Plaks.a (7.1.33.40-41) on the Himalayas. At Keda_ra, she turns west (pas'cima_bhimukhi_) and conceals herself underground. (7.i.35.25,26). Beyond Pa_pabhu_mi, she reaches Gandharvaku_pa and flows further on a westward course. (7.i.26,27). Traversing through Bhu_ti_s'vara and Rudrakot.i before reachintg S'rikan.t.ha des'a (7.i.35,29-31; with its capital Stha_nes'vara or Thanesar near Kuruks.etra), she reaches Kuruks.etra and flows on through Vira_t.anagara, Gopi_yanagari (near Vira_t.anagara) and Deviks.etra, before reaching Pas'cima des'a (7.i.36.52). She then traverses the Kharjuri_vana (where she is called Nanda_), Ma_rkan.d.a_s'rama, Arbuda_ran.ya, Vat.avana, Vam.s'astamba, Ka_kati_rtha, Dha_res'vara, Pun.d.ari_ka, Ma_tr.ti_rtha, Anaraka, San:games'vara, Kot.i_s'vara and Siddhes'vara. She joins the Pas'cima Sa_gara. (7.i.35.32-51). She is called Pra_ci_ Sarasvati_ (5.i.57.31), Sa_vitri_ and Vedama_ta_ (5.iii.3.10). As Vedama_ta, she is the very personification of the Vedic culture. She is bra_hmi_ mu_rtih, the incarnation of Brahma_ and hence, sacreed (5.iii.9.47). (loc.cit. A.B.L. Awasthi, 1965, *Studies in Skanda Pura_n.a*, Pt. I, Lucknow, Kailash Prakashan, pp. 153-154).

Va_k is Sarasvati

Gopatha Bra_hman.a (2.20) states that worship of Sarasvati_ pleases Va_k, because Va_k is Sarasvati_: atha yat sarasvati_m yajati, va_g vai sarasvati_ va_cam eva tena pri_n.a_ti. The very institution of the yajn~a itself which is identified with the gods is also identified with Va_k (TB 1.3.4.5: atho praja_pata_v eva yajn~am pratis.t.ha_payati praja_patir hi va_k; TB 16.5.16: va_g vai sarasvati_ va_g vairu_pam vairu_pam eva smai taya_ yunakti; Sa_yan.a's commentary: va_k s'abda_tmika_ hi sarasvati_ vairu_pan~ ca va_ksamatutam; Sarasvati_ is speech in the form of sound (s'abda or dhvani); the word 'ru_pam' suggests a number of forms of speech; vairu_pam is the object denoted by speech). S'atapatha Bra_hman.a states that Sarasvati_ is speech and speech itself is sacrifice. (S'B 3.1.4.9,14). Sarasva_n is identified with mind and Sarasvati_ with Va_k. (sa_rasvatau tvo tsau pra_vata_m iti mano vai sarasva_n va_k sarasvaty etau: S'B 7.5.1.31; 11.2.4.9, 6.3). Sarasvati_ is pa_viravi_ (RV 2.1.11; AB 3.37); this is interpreted as s'odhayitri_ or as purifying; or, as sound created by a spear or lance (pavi_ra) or Indra's thunderbolt. [pa_viravi_ = a_yudhavati_]. Sarasvati_'s connection with the mind and the cow (beneficial yield) led her giving full inspiration (dhi_) to compose hymns, and, consequently, she became the goddess of wisdom. (J. Gonda, *Pu_s.an and Sarasvati_*, p. 10; Book Review, *JRAS*, 1986, no. 1, pp. 120-21). In the Brahma_n.d.a Pura_n.a (4.7.27), Sarasvati_ is described as one of the nine Ma_tr.kas accompanying Lalita_ in her fight with Bhan.d.a_sura.

Sarasvati assumes and is celebrated all over Bharat, in many ru_pa, many forms. Sarasvati is a river, the best of rivers, naditame. During the Vedic times, she was mightier than River Brahmaputra, River Sindhu. She was a powerful torrential, glacial river, *a_suri_ sarasvati* as R.gveda notes. Like

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any other glacial, Himalayan river, she had drained over 1600 kms. over virtually the region of North-west Bharat from Uttaranchal to Gujarat. She is called saptathi_, seven-streamed. Many large river systems were tributaries of Vedic River Sarasvati, including River S'utudri and River Yamuna.

She is a mother who nurtured a civilization. She nurtured the people living on the banks of the river. She is a divinity. She had attained the status of a divinity even in the days of R.gveda as R.s.i Gr.tsamada extols: ambitame, naditame, devitame Sarasvati (best of mothers, best of rivers and best of divinities). She is a divinity celebrated in Bharat as vidya_devi (divinity of learning), kala_devi (divinity of arts, crafts and technology), jna~a_nadevi (divinity of wisdom). She is the very embodiment of Brahma, the prayer; she is Brahmi which is the name of an ancient writing system of Bharat. She is mother beyond compare. Together with Mother Earth (Bhu_devi), she is Bharati, the very embodiment of everything that every Bharatiya stands for. She is Mahasarasvati. She is an affectionate mother, she is a nourishing river, she is a divinity who bestows not merely the ability to work with material phenomena, she is the spiritual Mother Divine who carries the Veda and Veena in her arms. She is s'rutidevi.
She is also smr.ti devi. She is accompanied by the peacock, ma_raka, which signifies the after-life and hence, people pay homage to her by offering ma_tr. tarpan.am in Brahmasarovar and in Pr.thudaka (Pehoa), taking a dip in the sacred a_pah, the sacred waters. She is richly endowed with many tirthastha_na-s and many r.s.i a_s'rama-s, a constant reminder of the heritage our ancestors, our pitr.s and ma_tr.s who have bequeathed for the present and future generations of all humankind.

As she comes alive again to drain most of Northwest Bharat, the Dharma of R.gveda will prevail again all over the world, governed by a spirit of rational enquiry and by lending a spiritual meaning to cosmic phenomena to recreate the One World where noble, free thoughts flow from all directions: a_no bhadra_h kratavo yantu vis'vatah. Yes, indeed, kurvanto vis'vama_ryam, let us make the entire universe noble. Let us pray to Mahasarasvati to lead us unto this nobility in a rhythmic *r.tam*. We owe this *r.n.am*, this debt, in memory of our ancestors who lived on the banks of River Sarasvati and who have made us what we are.

The evolutionary history of River Sarasvati has been explained in succinct scientific detail by Prof. KS Valdiya in his book: *Sarasvati: The River that Disappeared* (2002, Hyderabad, Universities Press). This is a follow-up on the scientific symposium held in Baroda earlier. (See BP Radhakrishna and SS Merh, eds., *Vedic Sarasvati, Memoirs of Geological Society of India*, 2000, Bangalore).

Celebration of a heritage through Rebirth of Sarasvati

Without its snow-bound origins, the Sarasvati became a shadow of its former self. Its people migrated upstream and settled in today's Haryana and western Uttar Pradesh. There seems to be archaeological evidence to this movement: The total absence of late Harappan settlements in the area of the Sarasvati is in sharp contrast to the dramatic increase in habitations in the plains of Haryana and western Uttar Pradesh. There is also a remarkable scarcity of Harappan sites around what are today's Yamuna and Sutlej. This is again in sharp contrast to the archaeological gold mines turning up in the dry channels of Punjab, Rajasthan and Sindh in Pakistan.

Finally, only flood waters flowed down the Sarasvati's once vast channel. It remained dry for several centuries, though some water again found its way in during the early centuries of the Christian era. The Sarasvati's decline and the loss of its civilisation are an indication of how tectonic

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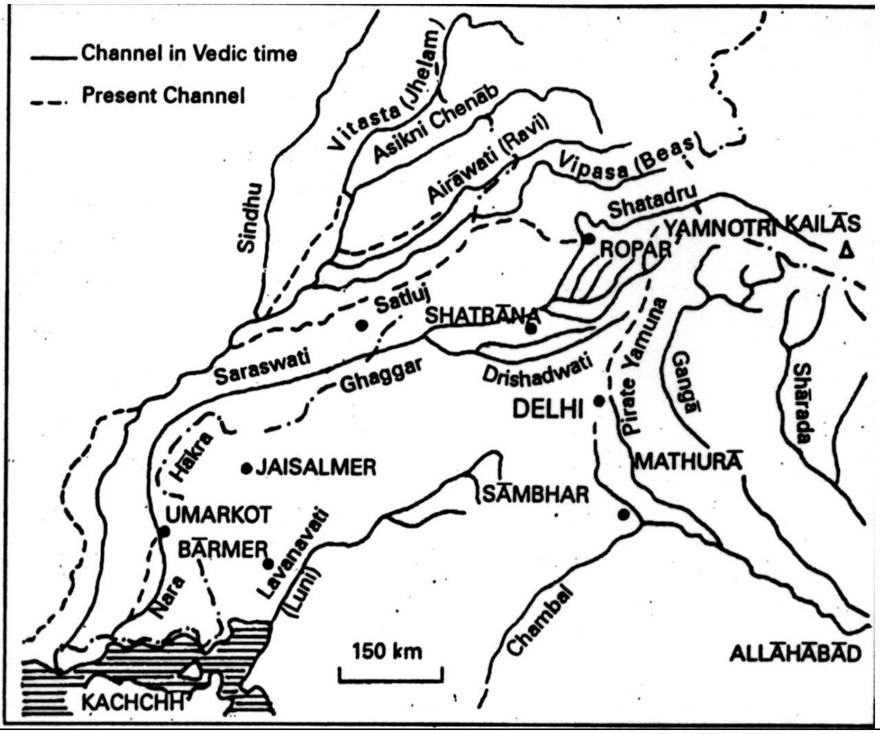
shifts can combine with localised climate change to dramatically transform human settlement. As the shifting Aravallis chopped off the Sarasvati's waters, the climate too was changing. Over the years western Rajasthan, once a green, rich expanse with extensive rainfall, gradually turned into a parched, desert land. Where there was once a torrent of water, there remained nothing but tonnes of drying sand, a few lakes that survive to this day, and of course the veins of groundwater under the earth.

River Sarasvati's desiccation also demonstrates how central rivers have been to civilisation and culture. With the Sarasvati gone, its place in mythology was taken over by the Ganga. To this day, it is the Ganga that is predominant to India's Hindu consciousness. But the Sarasvati, as the drilling rigs at Ghantiyal Ji should reveal, has not disappeared altogether.

The great Sarasvati River will flow again, its spiritual form will regain its Vedic glory, as the legacies of the river are flooding back all over again.
Vedic River Sarasvati is ground-truth: Story of the discovery of River Sarasvati

Vedic Sarasvati. Tamasa (with Yamuna) and Sutlej rivers, and Dr.s.advati (now represented by Chautang) were tributaries of River Sarasvati. [KS Valdiya, 1996].



Vedic Sarasvati is not myth; but *bhu_mi satyam*, ground-truth, 1600 km. long river, 6 to 8 kms. wide channels, from Manasarovar to Prabhas Patan (Somnath).
The search for River Sarasvati started over 150 years ago and thanks to a series of scientific investigations, the entire course of this gigantic river system which drained north-west Bharat over a distance of 1600 kms. from Manasarovar to Gujarat, has been traced. Together with the cumulative

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discoveries of over 2,000 archaeological sites on the banks of this river, the key to an understanding of the maturing of the riverine and maritime nature of the civilization unravel.

The search intensified during the last 25 years. In 1985,Vedic Sarasvati Nadi Shodh Pratishthan was established in Jodhpur, Rajasthan. A team of over 35 scholars led by the late Padmashri senior archaeologist, Shri Vakankar and Moropant Pingle started on a journey of discovery from Adi Badri to Somnath. They traversed over 3,500 kms. along palaeo-channels (ancient courses) of River Sarasvati. The journey which followed the path of Balarama inspired a number of scientists and scholars to further explore scientifically the old courses of Vedic River Sarasvati. Three more organizations are involved in the researches: Sarasvati Nadi Shodh Prakalp, located in Chennai; Sarasvati Nadi Shodh Sansthan, Haryana located in Jagadhri; and Sarasvati Nadi Shodh Sansthan, Gujarat located in Ahmedabad.These combined efforts of multidisciplinary teams of experts have borne fruit and the course of the river has been fully and conclusively defined. It has now become possible to state that River Sarasvati is ground-truth. With over 2,000 archaeological sites discovered on the banks of River Sarasvati, the civilization should be called Sarasvati Civilization, the foundation of Bharatiya Culture. It has also been established that the River will flow again to green the Marusthali and many regions of north-west Bharat.

The river was mightier than Brahmaputra, mightier than Ganga. Its average width of palaeo-channels (ancient courses) was 6 kms.; at Shatrana, 60 km. south of Patiala in Punjab, the width of the channel was 20 kms. since two trunk river streams – S'utudri and Yamuna – joined the River Sarasvati at this place.

Plate tectonics – the ongoing clash of Indian and Eurasian plates – resulted in topological changes in the flood plains and resultant river migrations. S'utudri migrated westwards to join the River Sindhu; Yamuna migrated eastwards carrying the Sarasvati river waters drawn from Paonta Doon valley (Himachal Pradesh) to join the River Ganga to constitute the Triven.i San:gamma. This evolutionary history of the river system an emphatic validation, by the earth sciences, of the cultural tradition of San:gamma of Ganga-Yamuna -Sarasvati.

The uplift of the coastline resulted in the formation of the Gulf of Khambat circa 12,500 years Before Present and the submergence of palaeo-channels (ancient courses) of Rivers Narmada and Tapati.

Event	Years Before Present	Reference
Uplift of Yamuna terrace in Dun Valley	< 3663+ - 215	Wesnousky, 1999
Deviation of Yamuna, Paonta Sahib	3900 3700	Wakankar, 1987 Valdiya, 1996
Deformation of underground sediment at Kalpi, Yamuna plain	<5000	Singh et al, 1997
Earthquake at Hastinapur, Yamuna plain	2664	Wilhelmy, 1969
Eastward diversion of Yamuna river	3750	Raikes, 1968
Abandonment of Kalibangan and downstream settlement in Ganganagar and Cholistan, due to drastic decline in river discharge	Mid Third millennium BCE	Mughal, 1995
Westward shift of Sutlej	Mid Second millennium BCE	Mughal, 1995
Deflection of Sutlej, Ropar	2600	Wilhelmy, 1969

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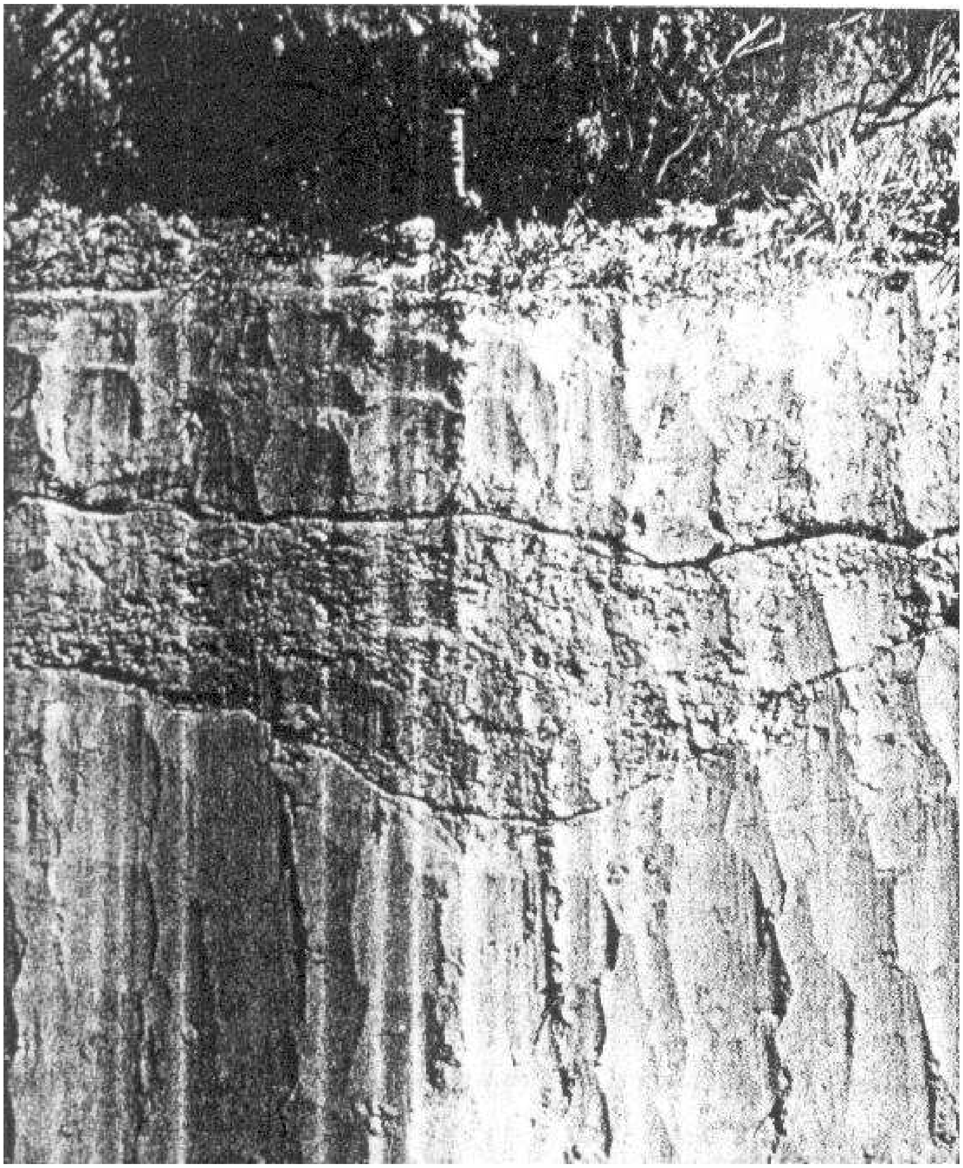
Earthquake at Dholavira, Kutch	4200	Bisht, 1993
Earthquake in Mahi valley, Gujarat	3320 + - 90 2850 + - 90	Maurya et al, 1998 Kusumgar et al 1998
Sinking of Dwaraka	3600	Rao, 1996
Sea-level fluctuation on Gujarat coastline	5000-4000	Gaur and Vora, 1999

Tectonic events in the later Holocene periods in North-west Bharat (After KS Valdiya, 2002, Table 5.1).

So it is that on a solar eclipse day, a million pilgrims throng to Kuruks.etra to take a holy dip in the



Tectonics recorded in an archaeological excavation at Kalibangan (After BB Lal)

Brahmasarovar in the Sarasvati River waters in a demonstration of spiritual adoration of a_pah, the sacred waters. So it is that the River Sarasvati is adored in over 70 r.ca-s in the R.gveda and as

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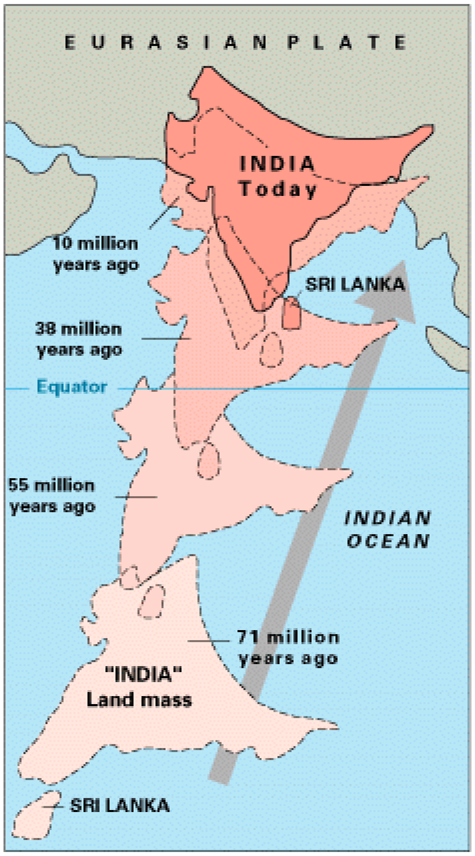
Divinity of arts, crafts and learning, prayers are offered to her twice every year – once on Ma_gha S'ukla Pan~cami and another on the eighth day as a_yudha pu_ja during the Navara_tri celebrations. It is a celebration of the collective memory of Bharatiya passed on from generation to generation, over a long span of time, of over 5 millennia; it is a memory of adoration for a mother, a river, a divinity who nurtured a civilization on her banks.



Collision of two continents; northward movement of Indian plate at a speed of 6 cms. per year and the rise of Himalaya by 1 cm. per year

About 225 million years ago, Bharat was a dvi_pa (island) still situated off the Australian coast. A vast ocean called Tethys Sea separated Bharat from the Asian continent.

Evidence from R.gveda

Nadisu_kta of the Rigveda: "Favour ye this my laud, O Ganga, Yamuna, Sarasvati, O Sutudri, Parushni With Asikni, O Marudvridha, Vitasta, O Arjikiya with Sushma, hear my call." [Translation by Ralph T.H. Griffith, *The Hymns of the Rigveda*, 2nd ed., Benares, 1926, II, p.490.] The su_kta omits the mention of Vipasa (Beas) cited in RV 3.31.1-3 and 4.30.11.

The su_kta emphatically locates Sarasvati as a river within the Sindhu-Yamuna river basins.

The rivers are in an east to west sequence: Sutudri is Sutlej (Ptolemy calls it 'Zaradros'); Parushni is Ravi; and Asikni is Chenab (called Askesines by Greek historians and by Megasthenes); Marudvridha is Maruwardwan, an affluent of the Chenab (Aurel Stein); Vitasta is Behat or Jhelum; Sushoma is Soan or Sohan, an eastern tributary of the Sindhu (called 'Soanos' by Megasthenes).

Sarasvati is described as follows in R.gveda hymns:

eka_cetat sarasvati_ nadi_na_m s'uciryati_ giribhya a_ samudra_t
ra_yas'etanti bhuvanasyabhu_re ghritampayo duduhe nahus.a_ya (RV. 7.95.2)

Pure in her course from mountains to the ocean Sarasvati river bestows for Nahusha nutritious milk and butter.

a_ yatsa_kam yas'aso va_vas'a_nah sarasvati_ saptathi_ sindhuma_ta_
ya_h sus.vayanta sudugha_h sudha_ra_ abhisvena payasa_ pipya_na_h (RV. 7.36.6)

May the glorious seventh (stream) Sarasvati, the mother of the Sindh and other (rivers) charged with copious volume of water, flow vigorously; come together, gifting abundant food and milk.

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[There is a possible interpretation that Sarasvati had seven tributaries and that the Indus and her 5 tributaries: Sindhu (Indus), Sutudri (Sutlej), Parushni (Ravi), Asikni (Chenab), Vitasta (Jhelum), Vitasa (Beas) were also the tributaries of Sarasvati. RV. 3.24.4 indicates the possibility that Drishadvati and Apaya were also tributaries of Sarasvati].

Viewed as an allegory, RV 1.32.10-13; 1.54.10; 2.30.3 hymns are explained as follows: "It looks as though the Vedic sages experienced the life and death of the river system which, they loved most, due to long spell of glaciation (ice age) and warming. They expressed it in terms of periodic war between Indra and Vritra. The frozen rivers (Glaciers) occupying zig-zag passages were visualised as the great serpent 'Vritra' who withheld water and the Sun god 'Indra' who released the water. The tussle between this natural phenomen of freezing and thawing of water was described as a war between the two...Two important tributaries, the Sutlej and the Yamuna; Sutlej (Sutudri) rises near Manasarovar whereas Yamuna from the western slope of Bandarpunch in the Jamnotri glacier; both being snow-fed perennial rivers had enough water to contribute...". (D.S. Chauhan, 1999; loc. cit. Murthy, 1985; Wakankar, 1985; Hillebrandt, 1990).

da_spatni_rahigopa_ atis.tannirudha_ a_pah pan.ineva ga_vah
apa_m bilamapihitam yadasi_d vritram jaghanva_m apatadvava_r (RV. 1.32.11)

Mastered by the enemy, the waters held back like cattle restrained by a trader (Pan.i). Indra crushed the Vritra and broke open the withholding outlet of the river.
Grassman (GW), Ludwig and Zimmer (AIL.10) are of the opinion, that in the R.gveda, Sarasvati_ is usually and originally meant a mighty stream, probably the Indus (Sarasvati_ being the sacred and Sindhu the secular name), but it occasionally designates the small stream in Madhyades'a, to which both its name and its sacred character were in later times transferred. Max Muller believes it to be identical with this small river Sarasvati_, which with the Dr.s.advati_ formed the boundaries of the sacred region Brahma_varta and which loses itself in the sands of the desert, but in Vedic times reached the sea. According to Oldham, a survey of ancient river beds affords evidence, that the Sarasvati_ was originally a tributary of the Sutudri_ (the modern Sutlej), and that when the latter left its old bed and joined the Vipa_s', the Sarasvati_ continued to flow in the old bed of Sutudri_." (A.A.Macdonell, The Vedic Mythology, Varanasi, Indological Book House, 1963, p. 87).

Stein identified Gan:gobheda with the shrine of Bheda_ devi at the village Hal-Mogulpur in Shrikru close to the “Kooshopoora”. The village shrine is in a small enclosure round a magnificent old Chinar tree. There is a lake on the summit of the Bheda_ hill and a place named Buda_bra_r in Kashmiri and Bijabra_ri in Pahari.

“The Gan:gobheda Ma_ha_tmya relates how the sage Pulastya performed long penances in the Satides’a and made the Gan:ga_ gush forth near him from Himavat mountain for the purpose of his sacrifice. When Pulastya decided to discharge the river after finishing his worship, Sarasvati_ stopped him from doing so and announced that a ti_rtha names Gan:gobheda would arise at the place from where the river issued. On the top of a hill where the level ground extends for ten Dhanus, a great pond would be formed and its eastern foot a stream called Abhaya_ would issue. A boon to the sage was granted for which he asked that the river may rest for ever by his side. The boon was granted and the Gan:gobhedati_rtha was created. With a desire to see the goddess Sarasvati_ the sage performed severe penances. Having been worshipped by him, Sarasvati_

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explains her sixfold nature to him. With reference to this, the sage gave her the name of Bheda_ and worshipped her as Ham.sava_gi_s'vari_ Bheda_. Since then the goddess received worship at Gan:gobheda ti_rtha." . (Savitri Saxena, 1995, *Geographical Survey of the Pura_n.as*, Delhi, Nag Publishers, pp.732-733). The Ni_lamata gives a brief reference to the goddess Bheda_ at Gan:gobheda (Ni_la. V. 1312; 1039)…it notes that the shrine of Bheda_ was made by Pulastya.

The reference to Pra_ci_ Sarasvati_ in many ancient texts assume that there was a western Sarasvati_ in relation to the Sarasvati_ river courses and tributaries identified in the Kuruks.etra, Kuruja_n:gala regions. This western Sarasvati_ is simply the mighty river which flows after confluence with Ghaggar beyond Kalibangan, Suratgarh and Anupgarh towards the Bahawalpur province and beyond through Sind into the Rann of Kutch and throught the Nal sarovar towards Prabha_sa flowing beyond Lothal and Rojdi, to join the ocean. The western Sarasvati_ is the saptathi_ sindhuma_ta_ or seven-sistered river referred to in the R.gveda (RV. 7.36.6). This is an indication that the mighty Sarasvati_ river had seven tributary rivers. In another reference, Sarasvati_ is called the seventh (RV. 7.36.6); the other six are the five Punjab rivers which are the tributaries of Sarasvati_ river (VS 34.11) and Sindhu. The description of Sarasvati_ in these terms is clearly a reference to the Ghaggar-Hakra-Nara river course which ahd been noted even at the time of the advent of the Arabs in Sind. (cf. Raverty, Mihran of Sind and its Tributaries, *JASOB*, Vol. LXI, Pt. I, Extra No. 1892, pp. 471-3 and 475 f.; *JASOB*, Vol. LXI, Pt. I, No. III-1892, pp. 155-297).

Evidence from *Mahabharata*

sarasvati_ pun.ya vaha_... samudraga_ maha_ vega_ (MBh. 3.88.2)

Holy flow of the Sarasvati joins the sea impetuously.

The Great Epic has a treasure of geographical information about the courses of the River Sarasvati and also the pun.ya ti_rthas and a_shramas of r.s.is located on the banks of the river. This comprehensive evidence authenticates the *Maha_bha_rata* as the sheet anchor of the textual evidence for the ancient history of Bharat.

The Great Epic enumerates the janapadas around the land of the Kurus: Pa_n~ca_la, Cedi, Matsya, S'u_rasena, Pat.accara, Das'a_rn.a, Navara_s.t.ra, Malla, S'a_lva and Yugandhara:

santi ramya_ janapada_h bahvanna_h paritah kuru_n
pan~ca_la_'cedimatsya_s'ca s'u_rasena_h pat.accara_h
dars'a_rn.a_ navara_s.t.ram ca malla_h s'a_lva_h yugandhara_h
(MBh. Vira_t.a 1.9)

Ka_lida_sa in Meghadu_ta describes the Sarasvati_ river as flowing in the Brahma_vartta janapada, near Kanakhala. (MD 1.52-54). The poet exhorts the cloud to drink the waters and sanctify itself: sa_rasvati_na_m antah s'uddhas tvam api bhavita_ varn.ama_tren.a kr.s.n.ah (MD 8.53). Ka_lida_sa notes that the course of the river is manifest on the surface. In an apparent reference to the two-fold division of Sanskrit and Pra_kr.ta, Sarasvati_ is seen to represent both as she praises S'iva and Pa_rvati_ through Sanskrit and Pra_kr.ta:

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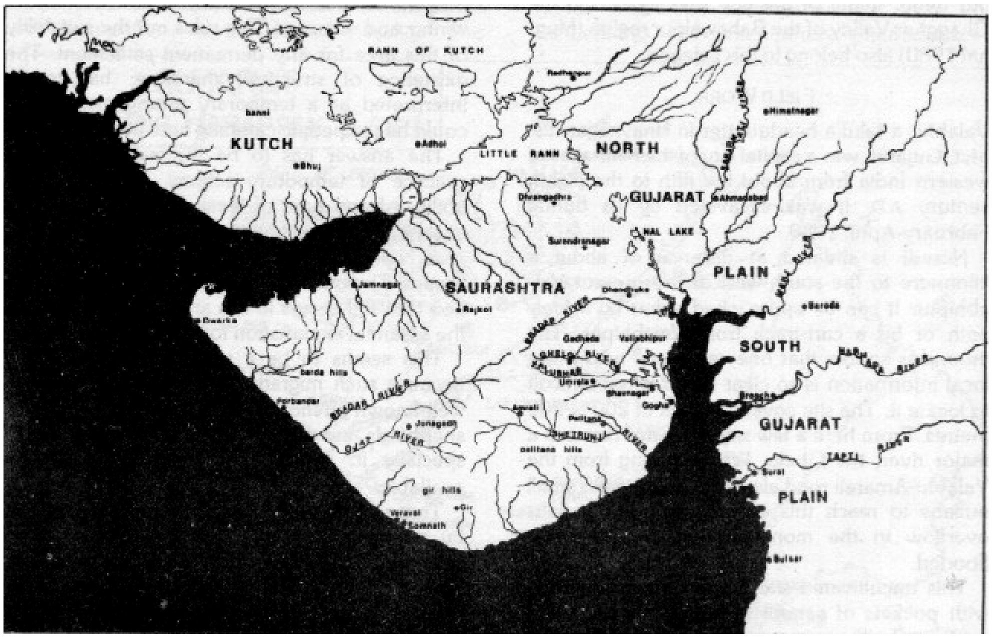
dvidha_ prayuktena ca van:mayena sarasvati_ tan mithunam nuna_va sam.ska_rapu_tena varam varen.yam vadhu_m
sukhagra_hyanibandhanena (Kuma_ra Sambhavam 7.90).

In the course of the River Sarasvati_ near Aravalli ranges, north of Gujarat on the Arasur hills is a temple of Kotes’vara Maha_deva. Flowing past Siddhapura, the river disappears in the deserts of Kachha. (For the presence of Sarasvati_ river in and near Mount Abu: Brahma_n.d.a P. Madhya. Upo. 13.69; MBh. Vana 192.20-21; A_di 16.19-21; Padma P. Uttara 135.2-3,7).



Civilization was at the mercy of water resources

At many sites, the civilization was at the mercy of fluctuations in the availability of water resources.

Raikes found the soil in Kalibangan, a "coarse greyish sand very similar in mineral content to that found in the bed of the present day Yamuna.” (Raikes 1968: 286). Hydrological and archaeological investigations indicate an "alternating capture of the Yamuna by the Indus and Ganges systems respectively" (Raikes 1968: 286) Yamuna (or Drishadvati-Ghaggar) river tributaries of the River Sarasvati, switched back and forth between two primary river channels. Kalibangan was abandoned circa 18th century BCE perhaps due to the following changes in river channels:

Westward diversion to Sindhu 2500-1750 BCE=750 years (coinciding with the Harappan period occupation).
Eastward diversion to Ganga 1750-1100 BCE=650 years (coinciding with the abandonment of Harappan sites).
Westward diversion to Sindhu 1100-500 BCE=600 years (coinciding with Painted Grey Ware sites).
Eastward diversion to Ganga 500-100 BCE=400 years (coinciding with a period of abandonment).

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Westward diversion to Sindhu 100 BCE-500 CE=600 years (coinciding with the Early Historic period).
Eastward diversion to Ganga in about 500 CE (coinciding with a period of abandonment).

"Archaeological evidence...overwhelmingly affirms that the Hakra was a perennial river through all its course in Bahawalpur during the fourth millennium BCE (Hakra Period) and the early third millennium BCE (Early Harappan Period). About the end of the second, or not later than the beginning of the first millennium BC, the entire course of the Hakra seems to have dried up and a physical environment similar to the present day in Cholistan set in. This forced the people to abandon most of the Hakra flood plain (Mughal 1982: 94)."
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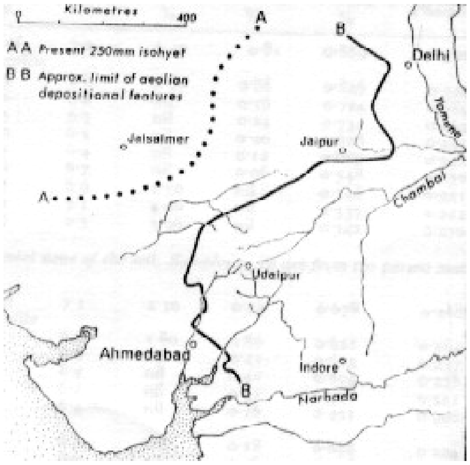
Mohammad Rafique Mughal has mapped 414 sites along 300 miles of the Hakra River bed in the Cholistan desert. This is incontrovertible evidence for a change in river course which decimated hundreds of civilization sites caused by creation of desert conditions which continue even day. While Ghaggar river courses switched back and forth, the Hakra changed its course almost permanently.

Drainage system in Gujarat



Ancient extent of Marubhu_mi (Thar desert) in comparison with the present 250 mm isohyet. Line AA is the present 250 mm isohyet and may represent the current eastern margin of major active natural dunes. Line BB is the approximate limit of Aeolian depositional features. “A tentative chronology of major climate phases in the Late Quaternary: Harappan wet phase (3000-1800 BC; evidence: pollen analysis from Rajasthan salt lakes, together with archaeological evidence of thriving sites in currently dry area (Singh 1971); Pre-Harappan drier phase (7500-3000BC) evidence: pollen analysis (Singh 1971). Moist phase (8000-7500 BC)(evidence: freshwater lake sediments; start to dune weathering; extensive microlithic settlements); major dry phase (Pre-8000 BC, Upper Paleolithic)(Evidence: dunes cover lake basins, absence of human activity except at margins.”(After Goudie, A.S., Allchin, B., and Hegde, K.T.M., 1973, The former extensions of the Great Indian Sand Desert, in: *Geographical Journal*, Vol. 139, Part 2, June 1973; p. 254; Fig. 3). All along the Sarasvati Basin which is like a sponge between two perennial rivers, the Ganga and the Sindhu, the settlement sites are only a few hundred feet above the mean sea level in contrast with the Himalayan peaks approaching 9000 metres above sea level: Bhiwani (720 ft.), Hissar (700 ft.), Sirsa (650 ft.), Suratgarh (700 ft.); Fort Abbas (537 ft.).

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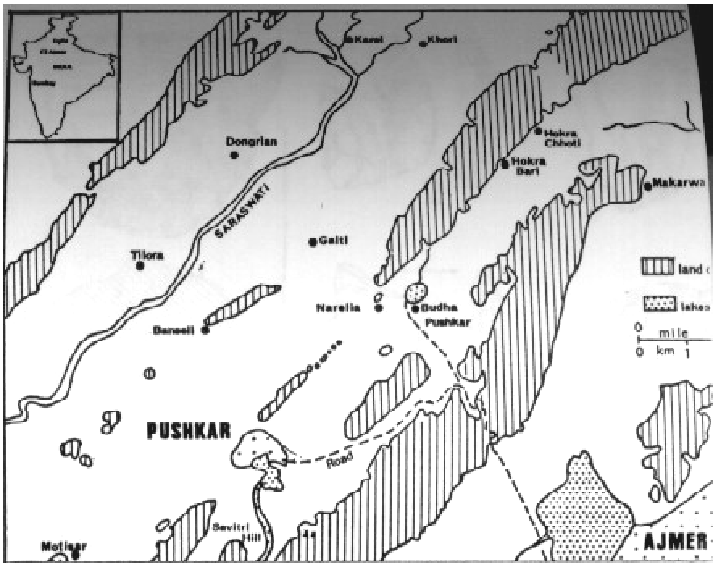
Tectonics were the principal determinants of the quantity of water which flowed through this Basin with is a doab between the Ganga and the Sindhu. Given the small nature of the relief, even minor shifts in surface contours resulted in significant changes in the surface and subsurface drainage systems.



Synoptic Overview of Quaternary Tectonism, Climatic variations and Effects ond rainage changes in NW India; tectonic changes:

1st major tectonic activity around 10,000 BP (creating the Gul of Khambat, submerging Narmada and Tapati river palaeo-channels)
Nawabandar-Babarkot southern coast of Saurashtra (Holocene, Before 4500 BP) (cf. Pant and Juyal, 1993)
Kalibangan 3700 BP (cf. B.B. Lal, 1984)
Dwaraka Submergence 3600 BP (cf. S.R. Rao, 1995)
3000-5000 BP Rise of Delhi-Haridwar Ridge. Reactivation of older lineaments and vertical movements along E-W and N-S fractures. Uplift of the Aravallis.
Tectonic activity around 11th/13th Century reactivation of E-W and N-S fractures over the northwestern plains.
56 B.C. Ujjain and 60 towns (cf. Baird-Smith, 1843).
1705 A.D. Bhavnagar (cf. Manuk, 1908).
1819 A.D. Allah-Band (cf. T. Oldham, 1883)
26 January 2001 Bhuj (plate tectonics of 8.2 intensity on Richter scale; this means an energy release equivalent to simultaneous explosion of 220 hydrogen bombs).

With such recurring tectonics and the continuing northerly movement of the Indian plate at the rate of 6 cm. per year (consequent rise of Himalaya by 1 cm every year), the northwest terrarin of Bharata gets tilted and with uplifts and subsidences, resulting in river migrations. Yamuna migrating eastwards, carrying Sarasvati waters to join Ganga at Prayag is one such result.

"...intermittent reactivation of the Kutchfault and the Luni-Sukri lineament (extending from the Great Rann of Kutchto Dehradun) causing severe earthquakes such as those of 1819 and 1937 AD of Kutchwhich raised land by 5-7m at several places forming e.g. the Allah Band dam... Shift in river courses must have been aided by differenial rise of land by reactivation of Cambay graben, Jaisalmer-Barwani lineament and Khatu lineaments which trend NW-SE... The Indus has migrated towards he northwest in the northern part and towards the wes in central and southern parts. Snelgrove (1979) shows this shift in lower reaches to be as much as 160 km westward in Sind. The eastern boundary of the Indus flood plains in SInd is along the Hakra-Eas Nara. If the Sarasvati was flowing into the Hakra-Nara bed the westward shift to the Indus might have also led to the

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disorganisation of the Sarasvati system and its final burial in Anupgarh plains. The Indus has migrated west by 100-120 km in Anupgarh sector. " (Ramasamy et al., 1991; B.Sahai, 1999).

Effects on Drainage:

Disruption of the early drainage by choking of their valleys and formation of inland lakes like Sambhar

At 3700 BP, fluvial activity dwindles, Sarasvati course is disrupted as is that of Drishadvati. Shatadru continues to flow after its capture of Vipas; abandoning the old Beas channel. Yamuna swings away to the east beheading any connction with its west flowing course.

Luni originates from its present source. The vertical movements along N-S and E-W fractures result in the formation of the new channel of Luni; following and E-W fracture till Balotra and then flowing along a N-S fracture forming its present lower course till it meets the Great Rann.

5000-7000 BP Sarasvati, Drishadvati, Shatadru and Sindhu flowed with full vigour, carried much water and formed an extensive drainage network.

Sutlej leaves its old course and joins the Indus. Ravi is captured by Chenab.

Sarasvati R. at Pushkar (After Allchin, B. and Goudie, 1972, Andrew, Pushkar: prehistory and climatic change in western India, in: *Man*, December 1972, Vol. 7, No.4). Skanda Pura_n.a (Prabha_sa 270/30) calls the Sarasvati_ Pratiloma_ Sarasvati_ and Pra_ci_ Sarasvati_ at Prabha_sa (cf. *Indian Antiquary*, VI, p. 192) and Pus.kara respectively. Va_mana Pura_n.a (50/4) and Padma Pura_n.a (Sr.s.t.i 15/148, 18/127, 148, 203, 218) note that the Sarasvati_ river is easily accessible at all places excepting at Kuruks.etra, Prabha_sa and Pus.kara. Sarasvati_ river is said to re-start in a westerly course from the Pus.kara lake after the disappearance of the river at Vinas'ana in Kuruks.etra. The five streams including Pra_ci_ Sarasvati_ are collectively referred to as Pan~ca-srota_ Sarasvati_. (Padma P. Sr.s.t.i 18.118, 127; 33.119-120). It is notable that the Skanda Pura_n.a also describes Sarasvati_ in Prabha_sa, near Camasobheda where the river reappears, as Pan~casrota_. (Sk. Prabha_sa 202.7).

Pus.kar is located close to a river named Sarasvati which joins the Luni river. This site has provided evidence of a sequence of settlements from the mid-palaeolithic to upper Palaeolithic and Mesolithic periods. A site in Bhilwara district, Bagor, has yielded tools and bones of wild and domesticated animals dated to Mesolithic period. The earliest phase is carbon-14 dated to between 5000 BCE and 2800 BCE. The microliths continue at Ganes'war (close to the Khetri copper mines) which emerges (ca. 2800 to 2200 BCE) as a Ochre Coloured Pottery (OCP) site with copper artefacts. Ganes'war is located on the banks of River Kantli which had joined River Dr.s.advati which was a tributary of River Sarasvati. Thapar conjectures that Ganes'war manufactured and supplied copper artefacts to the Harappans. These findings attest to a continuous habitation in the mid-Sarasvati basin in Rajasthan. (B.K. Thapar, *Recent archaeological discoveries in India*, Tokyo, 1985, p. 14, p. 17, p. 76, p. 102). Palaeontological investigations have indicated that the climate in Rajasthan was moist, wet and cool upto 8000 BCE and organized farming began around 3000 BCE. The period between 3000 to 17000 BCE was found to be a period of higher rainfall than at present. (P.K. Das, *The Monsoons*, New Delhi, 1998, pp. 123 and 129).

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Lopa_mudra_ met and married Agastya on the sea-shore near Prabha_sa. At the same place, the Ya_davas got drunk, fought among themselves and got annihilated. The place where Kr.s.n.a gave up his mortal body is known as Dehotsarga and is located near Prabha_sa which is also known as Soma-ti_rtha on the southern coast of Kathiawad or A_narta country. Kr.tsama_raprabha_sa is said to be situated on the bank of Sarasvati_. (Sk. P. Prabha_sa 199.1). To the north is river Bhadra_. (Sk. P. Prabha_sa 4.12-21; Na_rada P. II. 70.4-5). The forests on the banks of the river are called Ambika_vana (Va_mana Pura_n.a: 57/33) and Ka_mkyakavana (MBh. Vana 36/41). The river's confluences with three rivers are mentioned: with Gan:ga_ (gan:gobheda)(Padma Pura_n.a Svarga 32/3), Arun.a_ (Va_mana Pura_n.a 40/43-44), Manda_kini_ and Yamuna_. (Padma Pura_n.a Sr.s.t.i 11/15-16, 28/148). The Sarasvati_ course meeting the ocean at Prabha_sa is stated to have its source in the jungles of Gir in Saura_s.t.ra. (Savitri Saxena, 1995, *Geographical Survey of the Pura_n.as,* Delhi, Nag Publishers). The Sarasvati_ river is stated to reappear at three places: camasobheda, s'irobheda and na_gobhyeda. (Padma Pura_n.a 25/17-18; MBh. vana 130/3-5).

Ta_n.d.ya Bra_hman.a explains the association of Sarasvati_ with the great river through a legend: Praja_pati emitted the Word. The Word pervaded the whole (universe). It rose upwards as a continuous stream of water. (an apparent reference to the perennial nature of the river)[Ta_n.d.ya Br. 20.14.2; Caland (English tr.) *Pan~cavim.s'a Bra_hman.a*, Calcutta, 1931, p. 538]. The banks of the Sarasvati_ river in North-west India nurtured the development of the Vedic lore and learning. The river had flowed from the mountains to the sea (giribhya a_ samudra_t) and disappeared in the desert sands, as if heralding the end of the Vedic age. All groups of peoples had lived and were nourished on the banks of the Sarasvati_ river and all took the waters of the river without any distinction. (Matsya Pura_n.a CXIV.20). Together with Devika_ and Sarayu_, Sarasvati_ is described as saridvara_h. (MP CXXXIIII.24).

According to the Milindapan~ho (p. 114). Sarassati_ (Sarasvati_) issued forth from the Himavanta. (loc.cit. B.C. Law, *Geography of Early Buddhism*, 1932, Kegan Paul, Trench, Truber and Co., p. 39).

Vinas'ana as the place where Sarasvati_ river disappears is mentioned in Ta_n.d.ya Bra_hman.a (25.10.16: catus' catva_rim.s'ada_ s'vi_na_ni sarasvatya_ vinas'ana_t plaks.ah pra_sravan.as ta_vad itah svargo lokah sarasvati_sammitena_ dhvana_ svargam lokam yanti). As'vi_na is explained as ekos'va ekena_hora_tren.a ya_vantam adhva_nam gacchati ta_va_n eka_s'vi_nah (Sa_yan.a). Atharvaveda explains that A_s'vina may exceed 5 yojanas: yad dha_vasi triyojanam pan~cayojanam a_s'vinam, tatastvam punara_yasi putra_n.a_m no asah pita_ (AV. 6.131.3): If (yat) you run three leagues, five leagues, a horseman's day a journey, then shall you come back; you shall be father of our sons. A yojana may be 8 kros'a (1 kros'a = 2 miles). Thus, the distance between Vinas'ana and Plaks.a Prasravan.a may be estimated to be 44X16 = 704 miles. Plaks.a Prasravan.a is at a distance of 44 a_s'vina from Vinas'ana, an as'vina being the distance traveled by a consistently moving horse in one complete day and night. Plaks.a Prasravan.a is the source of the Sarasvati_ and Vinas'ana is the place of her disappearance. Maha_bha_rata places Vinas'ana at the meeting point of the regions lived in by S'u_dras and A_bhiras. Vinas'ana is mentioned as a region in the Baudha_yana S'rauta Su_tra (1.2.9): A_ryavarta lies to the east of the region where (the Sarasvati--assumed) disappears, to the west of the Black-forest, to the north of the Pa_ripa_tra (mountains), to the south of the Himalayas. (Max Mueller, *Sacred Books of the East*, Delhi, 1964, Vol. XXXII, p. 59). Vinas'ana is also mentioned in the Pan~cavim.s'a Bra_hman.a and the Jaimini_ya Upanis.ad Bra_hman.a.

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Bharadwaj identifies Plaks.a Pras'ravan.a as Lavasa reserved forest (30^0 42'N; 77^0 9'E) in lowers mountains in Pacchad sub-division of district Nahan in Himachal Pradesh. (Bharadwaj, O.P., 1986, *Studies in Historical Geography of Ancient India*, Delhi, pp. 8-19).

S'ri_ Hars.a in *Nais.adhi_yacarita* (Nais.adhi_ya maha_ka_vya kavipras'asti XXII.2) refers to Sarasvati_ as a river in general: dis'i dis'i girigra_va_nah sva_m vamantu sarasvati_m, let the mountain-stones flow their river (sarasvati_m) in all directions. In Nais.adhi_ya maha_ka_vya (IX.51), he elaborates on Sarasvati_ both as a river and as Va_k, using the phrase, sarasvati_rasaprava_hacakres.u bhrama_mi te bhaumi. With the blessings of S'a_rada_, another form of Sarasvati_ adored as the guardian deity in Kashmir region, the Nais.adhacarita gained literary merit.

"The image created in the R.gveda for the Sarasvati River is one of a powerful, full flowing river, not easily reconciled with the literal meaning of the name "Chain of pools"…It could be that when the composers of the Vedas first came to the Sarasvati it was a river of great magnitude…This carries with it an interesting chronological implication: the composers of the R.gveda were in the Sarasvati region prior to the drying up of the river and this could be closer to 2000 BC than it is to 1000 BC, somewhat earlier than most of the conventional chronologies for the presence of Vedic Aryans in the Punjab. The geography of the R.gveda is centered on the Punjab, and the reference, 'seven sisters', is to the 'saptasindhava' the 'seven rivers' of the region…There are a number of points that suggest that the modern dry river bed with the name Sarasvqati was also the ancient river, not the least of which is the historical continuity presumed in the nomenclature itself. In a key passage of the R.gveda, the so-called 'River Hymn' in Book X, Hymn 75, the author enumerates a series of rivers, evidently in order, beginning from the east; Ganga, Yamuna, Sarasvati, Sutlej and Ravi…the hymn alludes to the *Paravatas*, a people shown by later evidence of the Pancavim.s'a Bra_hman.a to have been in the east, a very long way from their original home, if Sarasvati means Indus. Again, the Purus, who were settled on the Sarasvati, could with great difficulty be located in the far west. Moreover, the five tribes might easily be held to be on the Sarasvati, when they were, as they seem to have been, the western neighbours of the Bharatas in Kurukshetra, and the Sarasvati could easily be regarded as the boundary of the Punjab in that sense. " (Possehl, G.L., 1999, p. 363; Macdonell, A.A., and Keith, A.B., 1912, *Vedic Index of Names and Subjects*. 2 vols. London.: Vol. II, 436).

Today, Sindhu flows through the Sukkur Gap, a break in the Rohri Hills. The river flows through a gorge at the mouth of which is the Bukkur island. The stream becomes only 550 metres wide but over 20 metres deep. There are some suggestions that the Sindhu River did not flow through this Gap during the Indus Age but had flowed to the north around Sukkur. According to Pithawala (1959: p. 284), ca. 3000 BC the river took a southerly course to the east of the modern course, swung east joining the present Eastern Nara just below Umarkot and ending up in the Rann of Kutch. "…the main stream of the Indus flowed…somewhere in its present valley, that is, between the Rohri Hills and the Kirthar range. To enter this section of its course the river need not have run, as now, through the Bukkur gap, but may have passed northward of the Sukkur hills. But if the Indus slipped off its axial 'ridge' above this point to the left hand, what would be the inevitable consequence? The river would get on the eastern side of the Rohri hills and would not be able to regain the main valley till a point lower down it than the latitude of Chanhudaro. Thus about one hundred and fifty miles, reckoning axially, of the Indus valley that we know would be deprived of its river…We believe that the Indus was flowing not much if at all further from Mohenjodaro in its great days than it is now, and the long duration of the city's life implies a similar tenure of its

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general course by the river." (Lambrick, 1964: 80-1). The implication is that a possible shift of the river to the east led to the abandonment by the river of Mohenjodaro and consequent desiccation of the city.

Ancient Drainage Network in Rann of Kutch

Chitalwala notes an interesting site of Hajnali located near the junction of the Little Rann, Gulf of Kutch and Saurashtra. "At present the site is three kms. inland from the Gulf. It measures only 60 X 60 m. but has three metres of occupational debris...From its shape and size it seems to have been made up of a group of large structures; in the manner of a trading post...During high tide the waters of the Gulf come close to the site and it seems that in the past it was actually on the Gulf. With the recession of sea level it now stands inland. The name Hajnali is also suggestive in the context. It means 'the place of embarkation for pilgrims bound for Haj'. Likewise Lothal, with its dockyard an dindustrial township, is located much inland today, on the southern shore of Saurashtra… Settlements like Dholavira and Pabumath, which stood on the seashores during the Harappan times, are now on the margins of the Ranns. Sites like Hajnali and Lothal, also once located on the seacost, now stand further inland. A study of eustasy suggests there might have been a phase of regression in the level of the sea between 5000 and 3000 BP which corresponds with the eclipse of the Mature Phase of the Harappan Civilization." (Chitalwala, Y.M., opcit., 1984, p. 200; Agrawal, D.P. and S. Guzder, 1972, Quaternary Studies on the western Coast of India: preliminary observation, *The Palaeobotanist*, 21 (2): 216-22).

"...was the Rann during Harappan times geomorphologically what it is today? The tradition of the Ranns being an arm of the sea is both persistent and persuasive. Those who live in small villages on the margin fo the Rann speak of ships sailing across their waters bringing goods from distant lands. They nostalgically speak of a rich and benevolent merchant named Jagdusha and his ships with full consignment of gold in their holds, anchoring at many points along the shores of the Ranns. However, no one knows exactlyh when the Rann was actually a part of the Arabian Sea. Writing in 1907, Robert Siverights refers to Alexander Burnes who learned 'that vessels had been known to be wrecked on Pacham and that they came for shelter in heavy weather to the island of Khadir' (Siverights,R., 1907, Kutch and the Rann, *Journal of the Royal Geographical Society*, 29 : 531). Siverights further says that the Rann was navigable for many hundred years after the Arab invasion. But, by 1361 it is learnt from the historian who accompanied the Sultann Firuz Shah in the year that he led the expedition to Gujarat 'the intervening area that was once a marsh was now "a howling desert"' (Siverights, 1907: 531)...Mallinath, the great literary critic of the 14th-15th centuries, also mentions Kutch as a marchy region (Gazetteer of India, 1971: 1). It is, therefore, clear that in the 14th century the Ranns were what they are at present…" (Chitalwala, Y.M., 1984, Harappan settlements in the Kutch-Saurashtgra Region: patterns of distribution and routes of communication, in: Lal and Gupta, opcit., pp. 197-201). S.K. Gupta notes, that based on hydrological studies, 'even as late as 2000 years ago, Little Rann was about 4 m deep' and indicates that the Ranns were indeed under a permanent sheet of water at the time the Harappan culture flourished in Kutch. (Gupta, S.K., 1977, The Indus valley culture as seen in the context of post-glacial climate and ecological studies in northwest India, *Archaeology and Physical Anthropology in Oceania*, 6).

"All these rivers, originated in the Himalayan foothills and after draining large tracts of Panjab and Rajasthan fell into the then existing arm of the ancient Arabian Sea, now marked by the Great Rann of Kach. What is striking about these rivers is that after traversing the wide expanses of the region, their mouths came quite close to one another as mentioned in the R.gveda (Bhargava, 1964). Malik

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et al (199) have suggested that the present day northern part of the Great Rann represent the palaeo-delta complex comprising the mouth of the Shatadru, Sarasvati and Drishadvati. Tectonic changes in the Kutchregion appear to have caused he Shatadru to swing westward and flow through the Kori Creek into the Sea. The Sarasvati, on the other hand, swung eastward and extended its course through the Great Rann, Little Rann and Nal depression before finally debouching into the Gulf of Cambay near Prabhasa (Bhargava, 1964). Perhaps Drishadvati met this extended channel of Sarasvati in the Great Rann. Dholavira and Lothal, two famous Harappan cities were located along this extended course of Sarasvati.

The channel of an effluent of the Indus is seen in the Kori Creek in the northwest of Rann of Kutch. The channel course can be traced from the Creek upto Allaha Bund which was created by an earthquake in the region in the nineteenth century A.D. The largest ancient settlement in the Rann of Kutch are: Kotada (Dholavira) in the Khadir island and Surkotada, which is a relatively smaller site but functioned as a military outpost. About 20 kms. from Dholavira is a small settlement of Pabumath, where a seal with ‘unicorn’ motif and inscription was found and also numerous shell objects. The other sites are: Desalpur, Khirasara (Nakhatrana Taluka) which has yielded seals and a fortified settlement; Bhedi (near the village of Kothara in Central Kutch); a coastal village site of Navinal near Mundra on the Gulf of Kutch. Of these sites, Desalpur and Khirasara have shown evidence for occupation in both Mature and Late phases. “At Surkotada, throughout a compact citadel and residential annexe, complex has been found but no separate city complex as such has been available...Was Surkotada a defensive complex through the centuries to provide protection to the eastern movement of Harappans or a well protected trading center? Well fortified areea, guard rooms in the citadel and residential annexe, engraved figure of a soldier from Period 1C, a large number of sling balls and bone arrow heads from all periods are very interesting evidence in this direction.” (Joshi, J.P., 1979, The nature of settlement of Surkotada, in: *Essays of Indian Protohistory*, D.P. Agrawal and D.K. Chakrabarti, eds., Delhi, BR Publishing Corp.: 64).

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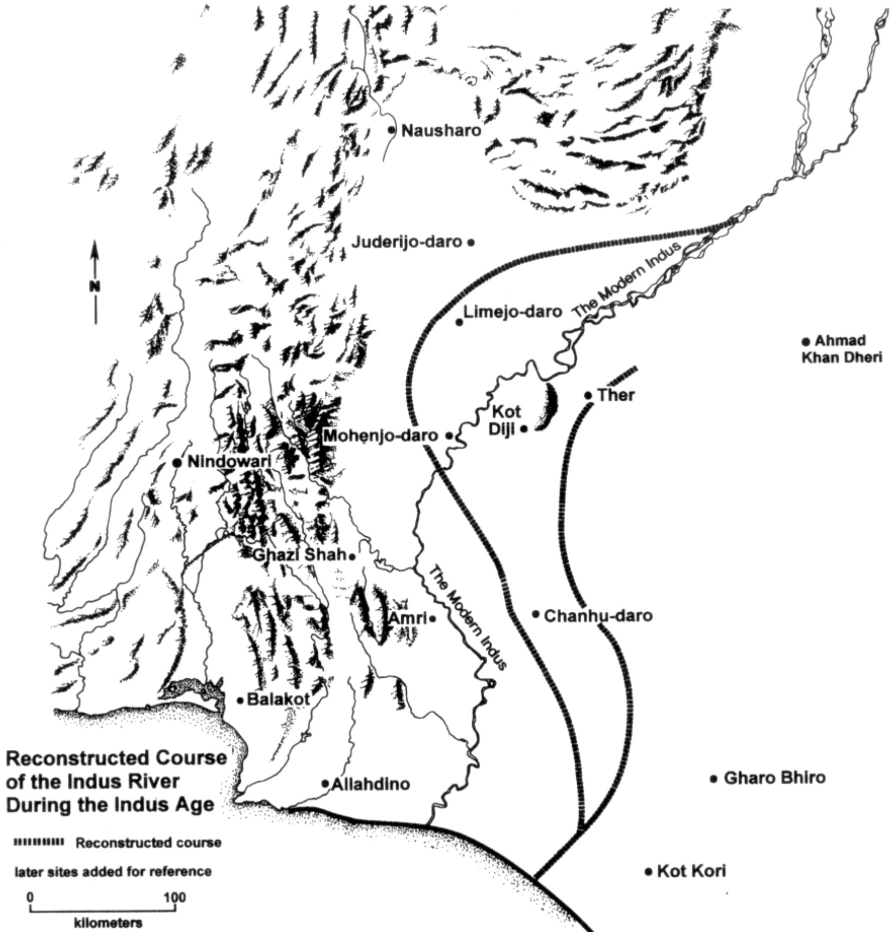
Palaeochannels of Sindh ca. 4000-2000 BC (After Possehl, G.L., 1999, Fig. 3.123). Combining the Warah Course in the northwest and the Samaro-Dharo Badahri Courses in the south, Flam notes that the combined course may represent the prehistoric course of the Sindhu. A conjecture is that the Western Nara was part of this course. Possehl, however, notes that this reconstruction may be erroneous since there is no evidence that the river flowed on the high ground between Lakhi Hills and the Bado Range if ever the river flowed into the Lake Manchar hollow.

Two significant locii emerge from this picture of settlements in Sind. What Louis Flam calls the Nara Nadi was indeed, the independent, perennial Sarasvati River System, combined with the waters of the Sindhu (below Naukot), had extended beyond the Little Rann of Kutch to link up with the Gulf of Khambat through the Nal depression. The settlements were close the raw material resources of the Bronze-age civilization, in particular the copper resources of Khetri mines in Rajasthan.. "To the east, the alluvium of the Indus seems very old and is interdigitated with silts from the Eastern Nara…The land surface is old and is now largely covered by shifting sand dunes so large that they can chose rivers. The sands hold seasonal lakes or dhands that are now used by pastoral nomads for agriculture and domestic water. The presence of a scatter of small prehistoric archaeological sites in this desert fringe is evidence that the same was probably true during the Indus Age." (Possehl, G.L., 1999, p. 284; loc. cit. Lambrick, 1964: 88-9). Eastern Nara may be viewed as the extention of the Sarasvati River System beyond Bahawalpur Province towards the Rann of Kutch. Civilization was at the mercy of shifting water run-offs



At many sites, the civilization was at the mercy of shifting patterns of run-offs and water resources.

Raikes found the soil in Kalibangan, a "coarse greyish sand very similar in mineral content to that found in the bed of the present day Yamuna." (Raikes 1968: 286). Hydrological and archaeological investigations indicate an

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"alternating capture of the Yamuna by the Indus and Ganges systems respectively" (Raikes 1968: 286) Yamuna (or Drishadvati-Ghaggar) river tributaries of the River Sarasvati, switched back and forth between two primary river channels. Kalibangan was abandoned circa 18th century BCE perhaps due to the following changes in river channels:

Westward diversion to Sindhu 2500-1750 BCE=750 years (coinciding with the Harappan period occupation).
Eastward diversion to Ganga 1750-1100 BCE=650 years (coinciding with the abandonment of Harappan sites).
Westward diversion to Sindhu 1100-500 BCE=600 years (coinciding with Painted Grey Ware sites).
Eastward diversion to Ganga 500-100 BCE=400 years (coinciding with a period of abandonment).
Westward diversion to Sindhu 100 BCE-500 CE=600 years (coinciding with the Early Historic period).
Eastward diversion to Ganga in about 500 CE (coinciding with a period of abandonment).

"Archaeological evidence...overwhelmingly affirms that the Hakra was a perennial river through all its course in Bahawalpur during the fourth millennium B.C. (Hakra Period) and the early third millennium B.C. (Early Harappan Period). About the end of the second, or not later than the beginning of the first millennium BC, the entire course of the Hakra seems to have dried up and a physical environment similar to the present day in Cholistan set in. This forced the people to abandon most of the Hakra flood plain." (Mughal, M. Rafique. "Recent Archaeological Research in the Cholistan Desert," Harappan Civilization: A Contemporary Perspective, Gergory L. Possehl, (ed.), Pp. 85-95, New Delhi: Oxford and IBH Publishing Company, 1982, p. 94)."
Fifty kilometers north of Lhasa (the capital of Tibet), scientists found layers of pink sandstone containing grains of magnetic minerals (magnetite) that have recorded the pattern of the Earth's flip-flopping magnetic field. These sandstones also contain plant and animal fossils that were deposited when the Tethys Sea periodically flooded the region. The study of these fossils has revealed not only their geologic age but also the type of environment and climate in which they formed. For example, such studies indicate that the fossils lived under a relatively mild, wet environment about 105 million years ago, when Tibet was closer to the equator. Today, Tibet's climate is much more arid, reflecting the region's uplift and northward shift of nearly 2,000 km. Fossils found in the sandstone layers offer dramatic evidence of the climate change in the Tibetan region due to plate movement over the past 100 million years.

At present, the movement of India continues to put enormous pressure on the Asian continent, and Tibet in turn presses on the landmass to the north that is hemming it in. The net effect of plate-tectonics forces acting on this geologically complicated region is to squeeze parts of Asia eastward toward the Pacific Ocean. One serious consequence of these processes is a deadly "domino" effect: tremendous stresses build up within the Earth's crust, which are relieved periodically by earthquakes along the numerous faults that scar the landscape. Some of the world's most destructive earthquakes in history are related to continuing tectonic processes that began some 50 million years ago when the Indian and Eurasian continents first met.
http://pubs.usgs.gov/publications/text/himalaya.html

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Gulf of Khambat Cultural Complex (GKCC)

Working in the area off the coast of Gujarat is a tough task with tide fluctuations upto 10 m height and high velocity of currents of upto 6 knots in turbid waters. Project Director Dr. S. Kathiroli, S. Badrinarayanan, D. Venkat Rao, K.M. Sivakkozhuntu, E. Srinivasan and other scientists of the National Institute of OceanTechnology(NIOT) under the direction of Prof.M. Ravindran, have done a remarkable scientific investigation and unravelled a major marine mystery in the Gulf of Khambat They have made a significant contribution to the emerging discipline of Marine Archaeology, The efforts of these Indian scientists and the technological excellence achieved by them should be lauded and encouraged. The work done by NIOT should make every citizen of the country feel proud that India is a force to reckon with in Science and Technology of the world.

NIOT team chanced upon the Gulf of Khambat Cultural Complex (GKCC) in the course of routine multi-purpose marine surveys undertaken along the long coast-line of the country. Once the unusual finds were recognized, the investigation was pursued vigorously and systematically, for two years, including four investigative visits to the site (comparable to four 'seasons' of work undertaken by archaeologists on the ground). Only after the scientists were reasonably satisfied and were able to authenticate the discoveries were the findings reported. This fact attests to the high-level of integrity and the scientific method which has governed the team's work.

Extensive sampling utilising state-of-the-art techniques for positioning using sophisticated equipment and collection of samples could bring out a remarkable collection of artefacts. Samples were collected using: (1) grab sampler; (2) dredgers; and (3) vibro-corer equipment. Over 1000 objects have been collected, out of which about 250 are of archaeological, cultural interest. The methods used for dating some selected artefacts, mostly at a depth of 40 m. below sea level, were:

Carbon-14: (a) National Geophysical Research Institute, Hyderabad; Calibrated Age: 7960-7380 BCE Range; Radio-carbon: 8592+- 235 BP (This is an interim report and a final report is awaited); (b) Birbal Sahni Institute of Palaeo-Botany, Lucknow (Calculated Age: 8450 – 8350 BP ; Age of sample: 7610+ - 100 BP).

Thermo Luminiscence: in process with the Physical Research Institute Ahmedabad for pottery samples

Accelerated Mass Petrometry from Regional Research Laboratory, Bhubaneswar for corals and shell artefacts

Results of the sampling and microscopic examination of artefacts (which have been thoroughly documented with a location index) revealed that they are essentially terrestrial formations with no evidence of their being of marine origin. The cores also revealed that just below half-a-metre thick marine sediments, the entire material is fresh water alluvium with a remarkable number and types of fresh water shells.

State-of-the-art technology used by NIOT investigation team included:
Side Scan Sonar (which is a widely accepted method for photographing the sea-bed) used for delineating sea floor surface features and mosaic
Sub Bottom Profiler – for cross-section of the sub-sea-bed

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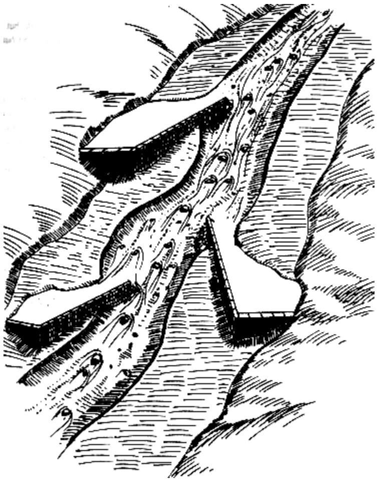
Magnetometre – to identify major structural elements including analysis of impact of tectonics

Under-water remote-controlled videography was attempted using very advanced equipment but due to high turbidity, the optical systems could not be worked beyond 10 m.; high turbidity which is characteristic of the Gulf makes the water opaque to light.

The major finding relates to a palaeo-channel (ancient river) lying on the sea-bed of GOK, running in an East-West direction. This channel appears to be aligned along the the present course of the River Tapti extended beyond the gulf into Saurashtra, Gujarat. Palaeo-river channel was identified for a distance of over 9 kms. in the middle of the Gulf along with ancient buried rectangular and square-geometrically-shaped basements (possibly foundations of buildings or platforms). On sampling, the palaeo-channel yielded several river conglomerates about 40 km. away from the present-day coastline, indicating, unambiguously, the riverine nature of the area. The conglomerate was found at 30–40 m depth, 40 km. west of Hazira near Surat in Gujarat. A piece of wood was also found at the same site (see the datings reported earlier). Some of the structures include tanks of size 40 m X 40 m and 45 m X 20 m. including what are referred to as gabar-bands in the Sindhu River Basin for training and diverting river water channels. Also seen are groups of constructions in an area 97 m X 24 m in size which could reasonably be interpreted as comparable to the 'acropolis' of the Harappan culture.



Gabar band on River Hab. (After Possehl).

Some of the astonishing finds include: kiln-burnt potsherds, fused articles with a flat surface with a cylindrical or flat object fused on to it; circular and triangular cakes with precisely drilled holes, even 2 in. long cylindrical beads perforated along the axis and two tablets-in-bas-relief with inscriptions (one with a possible pictorial motif of a person seated in a yogic posture – a typical pictorial motif of objects found at Mohenjodaro and Harappa inscribed with script and another with a triangular sign with lines drawn parallel to the base-line – a pictograph which looks similar to the sign of the Harappan script), semi-fossilized bones (of a bovine), a fossilized jaw-bone, a fossilized part of a vertebral column, a human tooth., semi-precious stone beads with perforated holes of 1cm to less than 1 mm. in diameter.

All these artefacts found only on the banks of the river-bed are indicative of human activity, perhaps a precursor of the maritime-riverine civilization that would unfold in the Sindhu Sarasvati River Basins. The stone structures – polished stone pillars and stone rings --, found at Dholavira, a cultural site in another Gulf close-by, the Rann or Gulf of Kutch, close to the sea and some river channels -- should be comparable to the neolithic nature of the finds of GKCC on a river bank and close to the sea.

The area of the GKCC is a neo-tectonically active terrain and is a graben (like a rift valley) because of its depressed position topographically. When there was a major sea-level rise during the period 6900-7900 BP the entire present area of Gulf of Khambat was inundated by onrushing sea-water and became the Gulf of Khambat. The entire GOK area had perhaps sunk taking down with it the

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then existing part of the river (maybe an extension of River Tapti or one of its tributaries) and ancient settlements, along the banks of the ancient river.

Since sea-level rise is involved in understanding the history of the formation of the Gulf of Khambat, we have to look for and likely to find similar palaeo-channels and cultural complexes in other parts of the Gulf. Further investigations are likely to reveal early human settlements in the area. As observed so perceptively in the report which appeared in a scientific journal:“If we are keen to discover what possibly lies buried under the sea off an approximately 7000 km. coastline, more facilities in the area of marine archaeology would need to be developed in the country. India has to equip itself with tools to conduct work on marine archaeology.” [CURRENT SCIENCE, Vol. 82, No. 4, of 25 February 2002, ‘The seabed reveals artefacts; will India now hone its skills and tools for diving into the realm of marine archaeology?’]

We are on the threshold of further discoveries along the long coastline of India. The efforts of institutions such as NIOT should be encouraged and further efforts made at creating a network of scientists and scholars of a variety of disciplines to collaborate, in a team effort, as a colloquium, under the leadership of NIOT, to unravel the mysteries of the heritage of the country that lie on the sea-bed of the Sindhu sa_gara, the Indian Ocean and the Bay of Bengal.

Tectonic Uplift of the Coastline

Tectonic uplift on a grand scale is evident at seaports along the Makran coast, such as Sutkagendor, Sotka Koh, and Bala Kot; these sites are now about 50 km inland. "These displaced ports made it evident that the coastline of Pakistan had risen considerably during the past 4,000 years, with the initial rise apparently having occurred during the Harappan period" (Dales 1966: 95).

This uplift is accompanied by the incursion of the sea into the present-day Rann of Kutch resulting in the formation of the Rann and fusing of many islands, such as the Khadir island on which is situated Dholavira (Kotda), into the peninsula of Saurashtra. The resulting disruption of sea-trade networks would have disrupted many industrial activities (such as the s’ankha (turbinella pyrum) based on the marine resource and carnelian/agate beads from Gujarat-Rajasthan region) of the maritime-riverine civilization. The proximity to Arabian sea trade routes is surmised as the *raison d'etre* for sites such as Sutkagen Dor and Sutkha Koh.

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Har-ki-dun valley (valley of the gods)
Bandarpunch massif, W.Garhwal, Uttaranchal

The birthplace of Sarasvati was the glacier close to Har-ki-dun valley in the Svargarohini mountain ranges of the Himalayas. Mahabharata describes the origin as Plaks.a Pras’ravan.a.

The course of the river traversed through Uttaranchal, Himachal Pradesh, Haryana, Punjab, Rajasthan, Rann of Kutch and Gujara to join the Sindhu sa_gara at Prabhas Patan (Somnath). R.gveda refers to this flow as “giribhya a_ samudra_t” (from the mountain to the sea). Pr.thudaks (Pehoa) is the place where River Markanda joins River Sarasvati and is celebrated by millions of pilgrims, as a site for the performance of s’ra_ddham in veneration of their ancestors In her journey, River Sarasvati received the tributaries of River Tamasa (referred to by Va_lmi_ki in the Ramayana), River Giri, River Yamuna, River Bata, River Markanda, River Somb, River Ghaggar, River Dr.s.advati, River Sutlej, River Aruna, River Chautang, and other streams flowing from the foothills of the Siwalik ranges.

Location of Va_lmi_ki A_s’rama on the banks of River Tamasa

Ra_ma_yan.a 2.65.5 describes Bharata’s route from Kekaya (capital: Rajagriha), after visiting his uncle Yudhajit, back to Ayodhya. Bharata crossed the confluence of Ganga and Sarasvati and entered the Bharudna forest. The very next s’loka (*Ra_ma_yan.a* 2.65.6) describes Yamuna as surrounded by mountains (’Parvatavrta’’). Thus the references in the Ra_ma_yan.a clearly refer to

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the Tamasa-Sarasvati-Yamuna in close proximity in the Himalayan mountains. Kekaya kingdom may be located in Kashmir, thus making Bharata's journey returning from Rajagriha to Ayodhya as from north to south-east crossing the Tamasa-Sarasvati, Yamuna and Ganga rivers. The riverbank of Tamasa (Tons), is not far-off from River Jahnavi i.e., river Ganga.

Some time after Narada left, Va_lmi_ki went to the river Ganga to bathe. A disciple by name Bharadwaja was with him carrying his clothes. On the way they came across the Tamasa (Tons) Stream. The water in it was very clear. Va_lmi_ki said to his disciple, "Look, how clear is this water, like the mind of a good man ! I will bathe here today." [Va_lmi_ki *Ra_ma_yan.a* - Bala Kanda in Prose Sarga 2].

The A_s'rama should be close to Yamunotri and Naitwar, en route to Har-ki-dun valley where the river Tamasa (Sarasvati tributary) originated from Rupin-Supin glaciers in Svargarohin.i himalayan peak (Bandarpunch massif). As the crow flies, the Gangotri glacier, the Yamunotri glacier and the Rupin-Supin (Sarasvati) glaciers are approximately within a distance of 20 kms. from one another.

'Drainage analysis, basin identification, glaciological and terrace studies suggest that Vedic Sarasvati originated form a group of glaciers in Tons fifth order basin at Naitwar (Netwar) in Garhwal Himalaya. In early stages, it occupied the present day drainage of Tons river upto Paonta Doon and took a westerly swing after receiving nourishment from Aglar, Yamuna and Giri. West of Paonta, it followed a westerly and southwesterly course along Bata valley and entered plains at Adh Badri. It continued to follow almost southwesterly course and traversed through Haryana, Rajasthan and Gujarat for nearly 1000 km and joined the Arabian Sea. Mighty Sutlej of today was then a tributary of Vedic Sarasvati. It is quite likely that Vedic Sarasvati might have come into existence during Upper Pleistocene period. The most important event that contributed to the desiccation of Vedic Sarasvati was reactivation of Yamuna tear fault across Siwalik belt between Kalesar and Paonta sometimes around 2450 BC (related to the earthquake evidenced in an archaeological site on the banks of the Sarasvati River: Kalibangan). As a result of this phenomenon, river Dris.advati_ came into existence which joined Vedic Sarasvati near Suratgarh in Rajasthan. With emergence of Bata-Markanda divide, complete reversal in the flowof Vedic Sarasvati occurred in Bata valley whereby it abandoned its previous course through Adh Badri-Markanda and occupied the conduit followed by river Dris.advati_. Meanwhile the Vedic Sarasvati catchment was reduced by 94.5% and got restricted to that of present day Markand. Subsequent to river Dris.advati_ migration from southwest to southeast, Palaeo-yamuna emerged that joined the Chambal river. Later, the Shatudri (Sutlej) also started shifting its course westerwards and consequently got completely detached from Vedic Sarasvati.

'As a result of the above-mentioned events, Vedic Sarasvti got completely deprived of its perennial source of nourishment from Himalaya. It now depends upon monsoon precipitation for its survival. With advent of drought conditions caused by either the emergence of a dry phase in climate or failure of monsoons for a number of years rather decades, Vedic Sarasvati got completely disoriented and acquired the status of present day oblivion.' (Puri, VKM, and BC Verma, Glaciological and Geological Source of Vedic Sarasvati in the Himalayas, New Delhi, *Itihaas Darpan*, Vol. IV, No.2, 1998, pp. 19-20).

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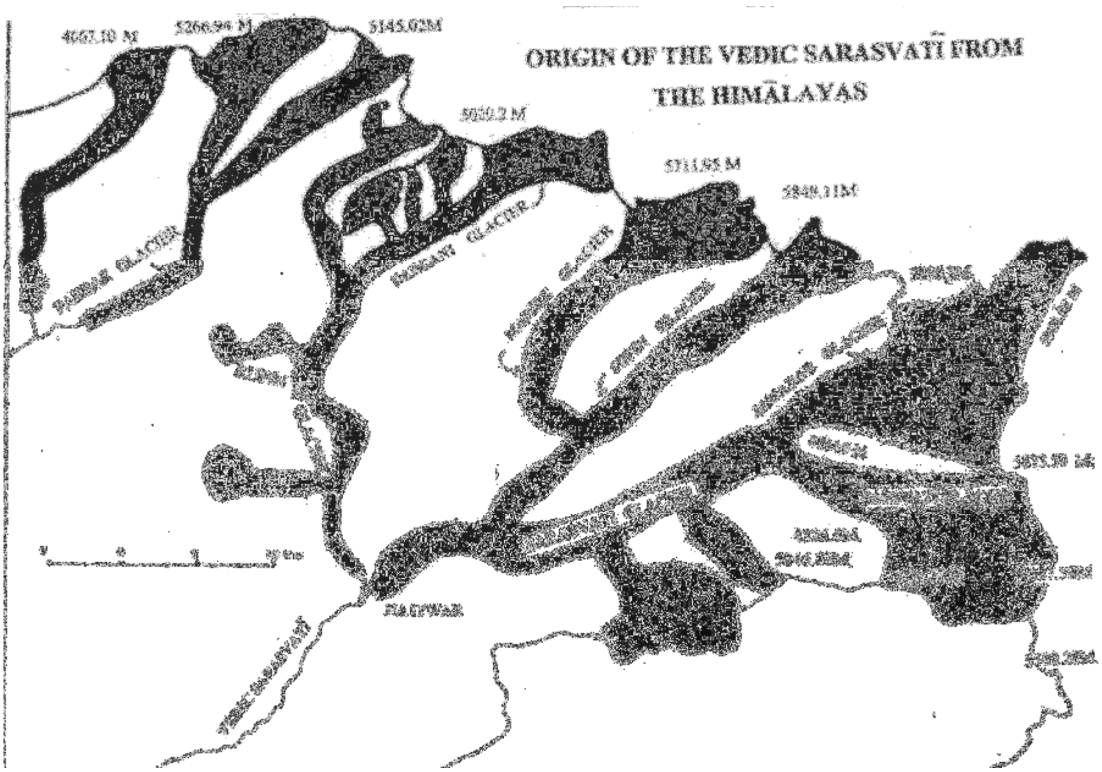

Origin of the Vedic Sarasvati_ from the Himalayas (After VMK Puri and BC Verma, 1998)

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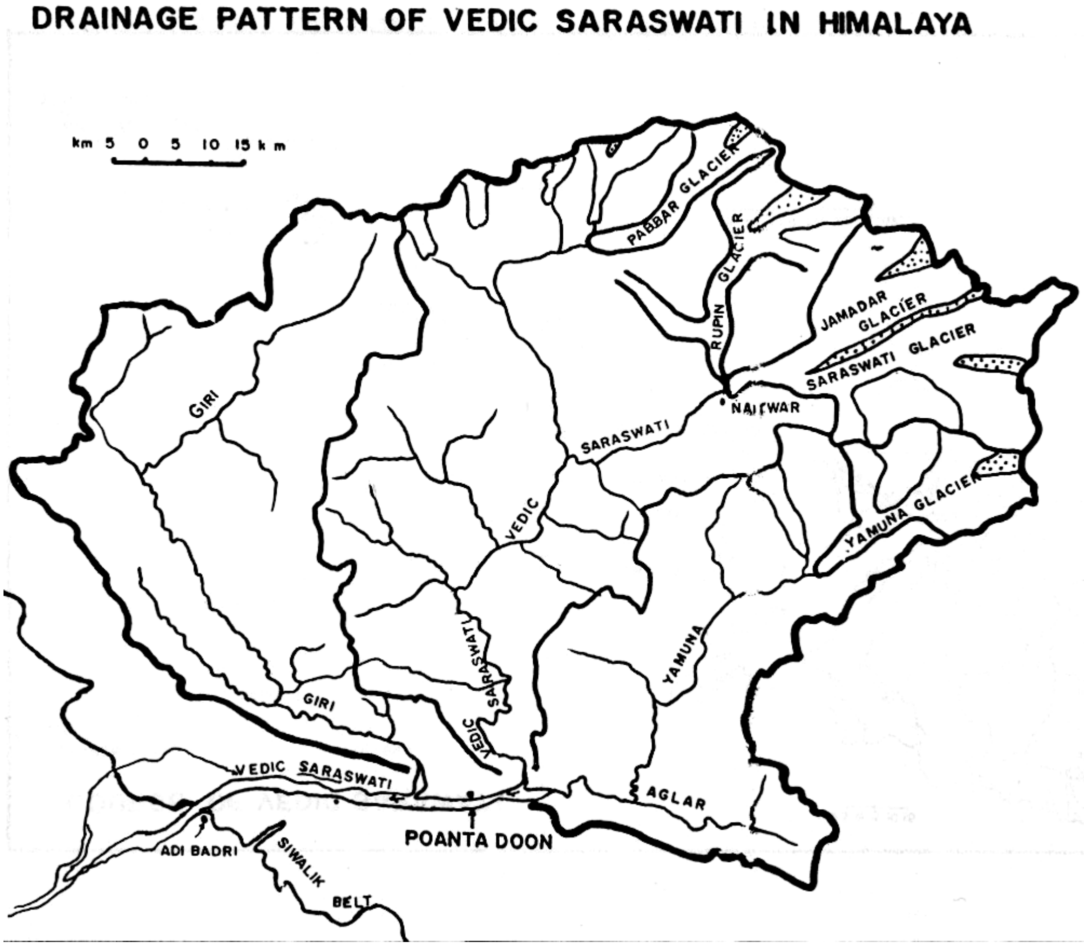

Drainage pattern of the Vedic Sarasvati_ in the Himalayas (After VMK Puri and BC Verma, 1998)

Bhan (1973: 257) notes three 'metropolitan centres' -- Mitathal, Rakhigarhi, Banawali -- 'dominating respectively the Yamuna, Drishadvati and Sarasvati valleys'. It is unclear if Mitathal can be placed in the Yamuna valley, unless, of course, the line of the western Yamuna canal to the east of the modern flow of the Yamuna extends further to the southeast and represents an old course of the river. Banawali lies above the floodplain of the dried-up Sarasvati (locally called Rangoi) on her right-bank. The ancient course of the River Sarasvati, now known as the Sottar valley (about 2 to 4 km wide) runs through the districts of Jind, Hissar and Sirsa in Haryana before joining the Ghaggar River near the Haryana-Rajasthan border. Bisht notes that there are mounds on both its banks, the site of Banawali being on one such mound on the right-bank.

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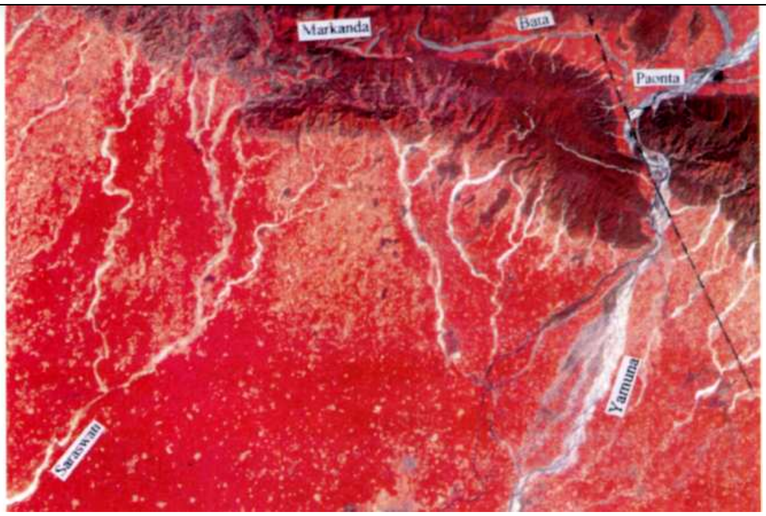
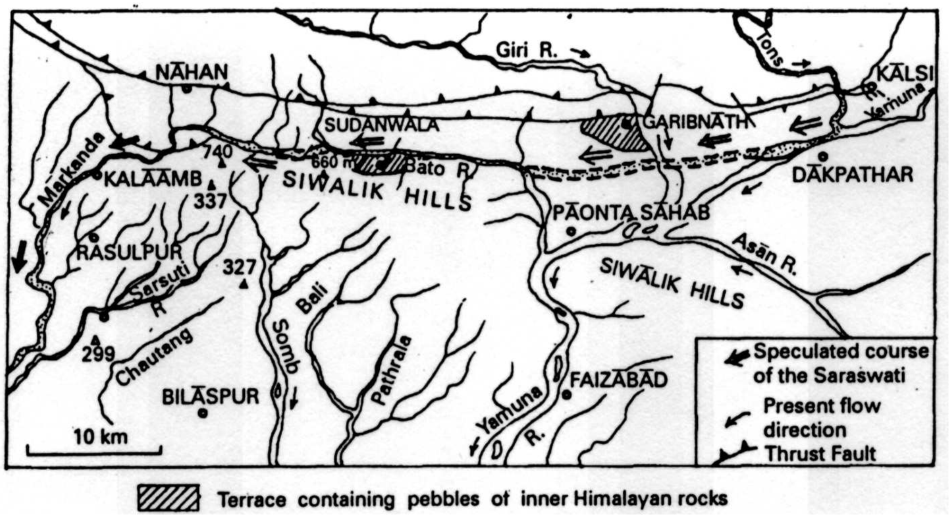


Siwalik hills were left-laterally displaced. NNW-SSE-trending tear fault is still active. The earlier west-flowing rivers were swung southwards, following the path of the fault. The Bata stream which joins Yamuna from the west has a very wide valley. [NRSA, ISRO, Hyderabad]



Tamasa (with its Yamuna branch) flowed west, in Pa_onta Sa_hab Dun; the west-flowing channels, now called Ba_ta and Ma_rkanda join Sarsuti (with wide channels). Metamorphic rocks from inner Manasarovar glacier which is the cultural capital of Bharat.

Plate tectonics resulted in the desiccation of the Sarasvati River between 2500 BCE and 1500 BCE. The clash of Indian and Eurasian plates resulted in the creation of a Yamuna-tear at Paonta Doon (Himachal Pradesh) and resulted in the diversion of River Yamuna away from the Bata River valley eastwards to join the River Ganga. Thus, Yamuna carried the waters of River Sarasvati to join Ganga at Prayag to constitute the Triveni San:gamam. Geological findings have thus validated the tradition of Bharat celebrating Mahakumbhmela at Prayag every 12 years, celebrating the Ganga-Yamuna-Sarasvati san:gamam. A second tectonic event resulted int he diversion of Sutlej River westwards at Ropar (90 degree turn) to join the River Sindhu. Thus Sarasvati was abandoned by two

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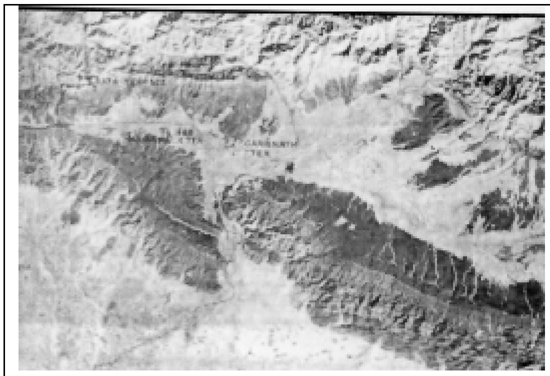
glacial tributary rivers. The River became a monsoon-based river flowing from Adi Badri (north of Bilaspur) at the foothills of the Siwalik ranges.



Satellite image analyses have shown the occurrence of Yamuna tear (due to tectonic causes resulting in the lateral shift of the Siwalik ranges) in Paonta Doon valley which resulted in the piracy of Sarasvati River waters by Yamuna river consequent upon the migration of the Yamuna river channel to join with Ganga river at Prayag. About 4500 years Before Present, Yamuna river was tributary of River Sarasvati flowing northwestwards along the Bata-Markanda divide between the Himalayan and Siwalik ranges and joining with Markanda and Sarasvati Rivers not far from Adi Badri (30-27N; 77-27E), 40 kms. north of Yamunanagar (Jagadhri) in Haryana. This river migration of Yamuna river was followed (circa 3500 years Before Present) by the migration of Sutlej river which took a 90-degree turn at Ropar due to tectonic causes. These two events of migrations of tributaries of River Sarasvati, the river was deprived of glacial waters and became a seasonal, rain-fed stream. Adi Badri is the place where the stream surfaces on the foothills of the Siwalik ranges. Cunningham also was of the view that Adi Badri was the place where the River Sarasvati surfaced on the plains. "Plans have been drawn to build check-dams for collecting monsoon water in Haryana, drilling of the dry beds of the Sarasvati and linking of the Sarasvati associated holy sites such as Thanesar, Vasishta Ashram, Pehowa, Kapala-Mochan and Brahmasarovar near Kurukshetra" (cf. Sarasvati Darshan brochure of Archaeological Survey of India (ASI), Shimla).

Triveni San:gamam

The Yamuna tear establishes the authenticity of Bharatiya tradition of the confluence of Ganga-Yamuna and Sarasvati at Prayag. Geologically, this tradition is explained as the capture of the waters of River Sarasvati by River Yamuna which carried these waters to join the River Ganga. The tradition is celebrated every 12 years as Mahakumbhamela which attracts over 50 million pilgrims to take a dip in the sacred san:gamma at Prayag.

The plate tecotonics which explain the Yamuna tear also explain the migration of the major tributaries of River Sarasvati: River Sutlej migrated westwards at Ropar and River Yamuna migrated eastwards at Paontasaheb. These geological findings have been extensively studied and discussed in the Geological Survey of Memoir No. 42 titled *Vedic River Sarasvati* published in the year 2000.

The course of the river has been fully traced over a distance of 1,600 kms. From Manasarovar glacier in W. Tibet (with an average width of over 6-8 kms. and at one point at Shatrana, 60 kms. south of Patiala,, a width of 20 kms. of palaeo-channels) to Somnath. This has been established thanks to the availability early on of Landsat images and later IRS 1-c and 1-d satellite images provided by Indian Space Research Organization, ground morphological studies done by the Central Ground Water Authority of India, the tritium analysis work of atomic scientiss in the Bhabha

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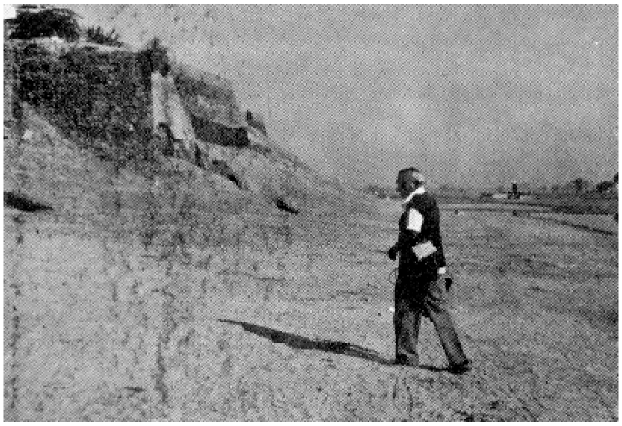
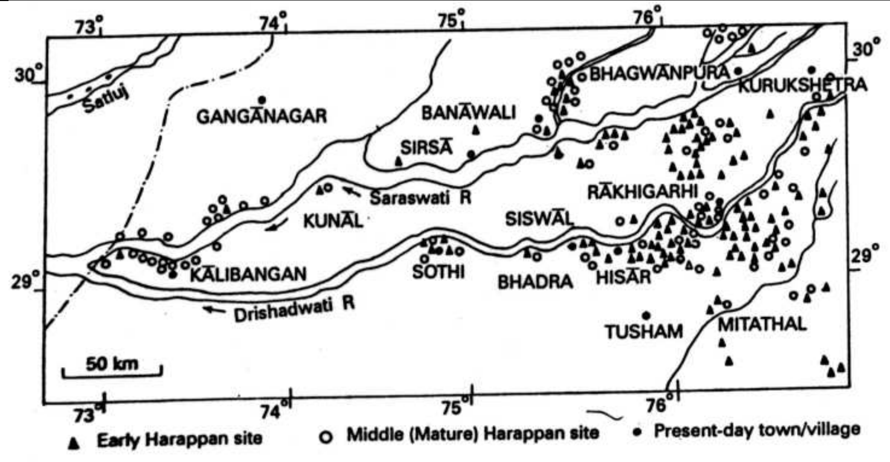
Atomic Research Centre, and glaciological/seismological studies by many scientists. The scientific investigations have proved the historicity of the geographical information provided in the *Mahabharata* about the course of River Sarasvati described in S'alya Parva during the course of the pilgrimage undertaken by Balarama, Kr.s.n.a's elder brother, from Dwaraka through Somnath to Plaks.a Pras'ravan.a traversing pilgrimage sites and a_s'ramas of R.s.is such as Udapa_na, Camasobheda, S'ivodbheda, Na_godbheda, Pr.thudaka (modern Pehoa), Ka_ra_pacava (Yamunotri).



Kamalagad.ha, Markanda River course (Shri Govinda Kheka_d.e) (After Bapat, V.D., and Umapathy, K.R. (tr.), 1994, *Lost' River Sarasvati, Mysore*, Bharatiya Itihasa Sankalana Samithi (tr. from Vakankar, L.S. and Parcure, C.N., 1992, *Lupta Sarasvati_ Nadi_ s'odh* (Marathi).

A secondary cause for the desiccation of the river system was climate change. Climatic changes may perhaps constitute only one of the reasons for the loss of vegetation and consequent migrations of people. "The weight of modern opinion appears to be against desiccation in the true sense of an actual climatic change; but prolonged human interference with natural drainage, deforestation of the Siwaliks, and so on have undoubtedly led to marked deterioration in ground-water conditions and so in vegetation. The accounts of Alexander's campaigns and Mogul hunts bear witness to considerable forest growth; and today on the more arid margins strong winds and frequent but torrential rains have led to a serious spread of shifting sands and more serious if less spectacular deterioration of good cultivated land." (Spate, O.H.K and Learmonth, A.T.A., 1967, *India and Pakistan: A general and regional geography*. 3rd edn. London: Methuen & Co.: 519).



Archaeological settlements in Sarasvati River Basin: Kalibangan Bana_wali Ra_khigarhi. [After Joshi and Bisht 1994].

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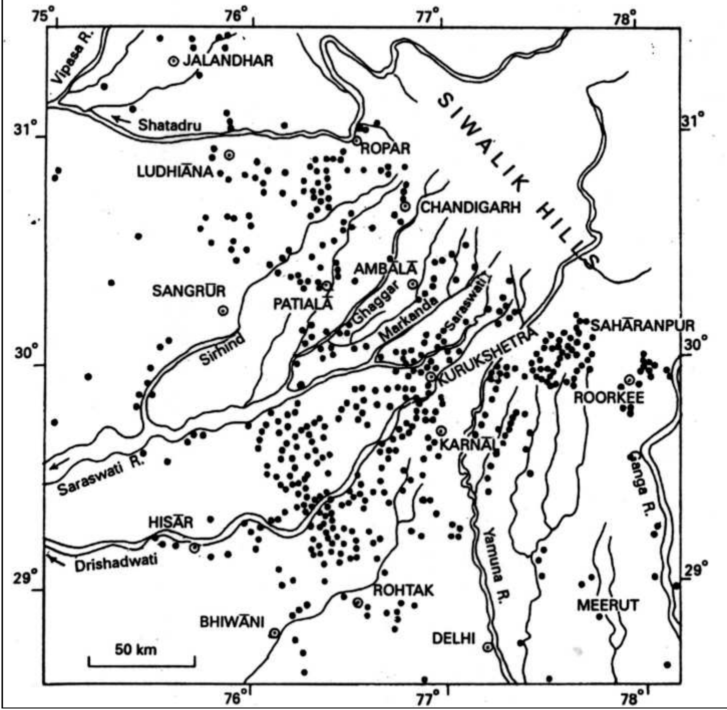
Out of 2,600 archaeological sites in North-west Bharat, 2,000 sites have been discovered on the banks of River Sarasvati making it the Sarasvati Civilization of circa 3300 to 1500 BCE (Before Common Era). Major sites are: Rupanagar, Rakhigarhi, Banawali, Lakhmirwala (Bhatinda, Punjab), Kalibangan, Dholavira, Dwaraka, Lothal, Somnath. Satellite images and geomorphological studies have established the entire course of Vedic Sarasvati River over a distance of 1,600 kms. from Manasarovar glacier (Himalayas) to Somnath (Prabhas Patan, Gujarat). BARC scientists have proved through tritium analysis the channels) carrying glacial waters dated to over 8,400 years Before Present. Plate tectonics caused by the clash of Indian Plate and Eurasian plate resulted in the tilting of the terrain of north-west Bharat This led to migration of Yamuna river towards Ganga to constitute the Triveni Sangamam and of Sutlej river towards Sindhu. Sarasvati River was thus deprived of glacial, Himalayan waters. It flows even today as a small stream, dependent on monsoon waters of the Siwalik ranges near Adi Badri (near Yamunanagar, Kurukshetra). People called Parvatis in Har-ki-dun valley (the origin point of River Sarasvati near Yamunotri) even today celebrate an annual festival honouring Duryodhana – an emphatic affirmation of the historicity of *Mahabharata*. The*Mahabharata* war was fought on the banks of River Sarasvati. Veda Vyasa was observing the celestial events from the banks of River Sarasvati and he has recorded 150 astronomical events in the Great Epic. These events have been proved using modern Planetarium Computer Software to have occurred in 3000 BCE. *Mahabharata* and Sarasvati thus become the sheet anchors of modern and ancient history of Bharat.



Density of settlements in Siwalik foothills upper reaches of River Sarasvati. This denotes upstream migration. Note: absence of settlements west of Ropar on Sutlej. [After Joshi and Bisht 1994].

The trunk stream which joined River Sarasvati was River Sutlej which emanated from Mt. Kailas, Manasarovar glacier. At one of the sites of the civilization, on the left bank of River Ravi, the site of Harappa, S'iva lingam-s were found in situ, attesting to the antiquity of a_gama and Eka-rudra-vra_tya tradition in Bharat. R.gveda notes that both vra_tya-s and yajn~ika-s were children of Praja_pati.

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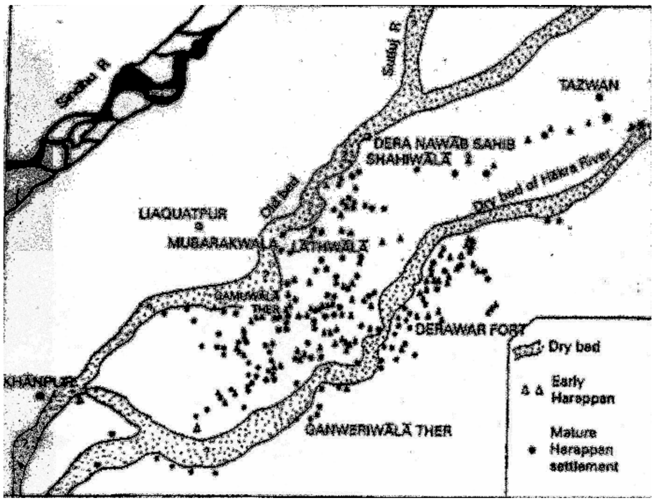
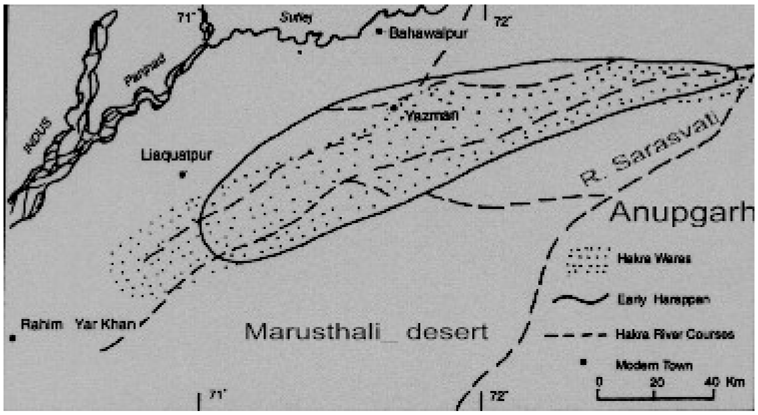
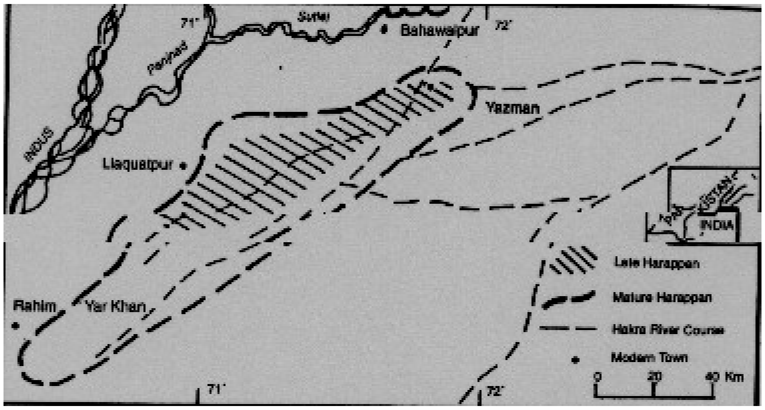


Early and mature Harappan settlements in Cholistan – Hakra sector of Sarasvati River: Ganweriwala. [After Mughal 1974].





Early phase site distribution area in Cholistan (After Mughal, 1992). The early Harappan sites are clustered around the course of the River Sarasvati (called Hakra in this region) flowing as an independent stream to join the Rann of Kutch; an earlier course is seen birfurcating at Anupgarh. Mughal reports 99 Hakra ware sites in Cholistan, mostly on mudflats and some on the fossilized sand dunes. These include 52 temporary occupation or camp sites, 45 settlement sites and 2 sites where industrial or craft-related activities are indicated by the presence of kilns. Only two of these sites were occupied in the succeeding early Harappan period and only four in the mature Harappan stage. Mughal links this distinct settlement shift to the change in the course of the Hakra (or River Sarasvati).

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Late phase site distribution area in Cholistan (After Mughal, 1992). The Late harappan sites are clustered around the westerly course of the River Sarasvati, west of Yazman. It is seen that the Stream of River Sutlej, flowing south-east of Bahawalpur, joins this westerly course of River Sarasvati. Mughal notes a distinct increase in the number of sites during the mature Harappan period. Out of 174 sites, 79 sites had areas 'exclusively ear-marked for kilns and mass production of items'. Since there is no site in this area where the mature Harappan phase directly overlies the early Harappan one, Mughal infers that another hydrographic change (the Sutlej River course) necessitated 'relocation of settlements on new ground'.

Sarasvati River is seen to be lost in the desert near Beriwala wheren an inland delta is formed (After Possehl, G.L., 1999, Fig. 3.139). "(a palaeochannel) ends as a shallow depression near Beriwala. On the LANDSAT imagery the lower course looks as if it debouched into the sea, but obviously it was unlikely that the sea was so far inland in Mid-Holocene. It is possible, however, that the chain of tectonic events which diverted the Sutlej and the easterly rivers away from the Ghaggar, caused a depression into which the Ghaggar, deprived of its major source of water, died into a lake-like depression." (Agrawal and Sood, 1982: 236). No settlements have been found around Beriwala; however, dense Harappan settlements have been found in hundreds around Fort Marot and Fort Derawar. (Mughal, 1997: 9).

There are indications that even as late as 16th century CE, Sutlej was flowing through the course of Ghaggar and had earlier charted an independent course into the Rann of Kutch. The satellite images do show the signature tunes of hundreds of ancient courses of river Sutlej (called Naiwals), as the river moved westwards away from Shatrana. "After it leaves the hills the river is never called Sutlej by the people and it has changed its course more than once in historical times. The history of those changes can be traced with considerable probability and detail. In the time of Arrian, the Sutlej found an independent outlet into the Rann of Kutch. In the year AD 1000 it was a tributary of the Hakra, and flowed in the Eastern Nara. Thence the former bed can be traced back through Bahawalpur and Bikaner into the Sirsa tahsil of Hissar, until it is lost near Tohana. From Tohana to Rupar, this old bed cannot be traced; but it is known that the Sutlej took a southerly course at Rupar, instead of turning west, as now, to join the Beas. Thus the Sutlej or the Hakra – for both streams flowed in the same bed – is probably the lost river of the Indian desert, whose waters made the sands of Bikaner and Sind a smiling garden. By 1245 the Sutlej had taken a more northerly course, the Hakra had dried up and a great migration too place of the people of the desert – as it thus became – to the Indus valley. The course then taken by the Sutlej was apparently a continuation of the present course of the Ghaggar. About 1593 the Sutlej left the Ghaggar and went north once more. The Beas came south to meet it, and the two flowed in the same channel under various names – Macchuwah, Hariani, Dand, Numi, Nili and Gharah. Then the Sutlej once more returned to its old course and rejoined Ghaggar. It was only in 1796 that the Sutlej again left the Ghaggar and finally joined the Beas." (*The Imperial Gazetteer of India (New Edition),* 1908, Volume XXIII, Clarendon Press, Oxford, p.179.)

"Classical writers mention as a great stream. (McCrindle, *Ancient India, as described by Ptolemy,* p. 88) But they do not mention it as a tributary of the Indus, though they mention the other four rivers – Jhelum, Chenab, Ravi and Beas – by the names as branches of the Indus. Their failure to mention a river of its dimensions then, could not be by oversight. It is argued in this connection that the Beas was the terminus of Alexander's expedition and hence his chroniclers have nothing to say of the country beyond it. But, be as it is, it is unthinkable that if the Sutlej, at all, joined the Indus, even its

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junction would have passed unnoticed by Alexander's men while sailing down the Jhelum…This fact inevitably shows that during the classical period it pursued an independent course…

"It is, therefore, inferred that: (i) In early historic times, an important river system, the Ghaggar, watered the Ghaggar plain. (2) The Sutlej was the most westerly and the Jumna the most easterly tributary of the Ghaggar and their present courses are of comparatively late acquisition. There are both physical and historical grounds for the belief that during early historic times the Juna discharged into the Sutlej. (Lyde, LW, *The Continent of Asia*, p. 393) (3) The affluents of the Ghaggar shifted east and west and were one after another beheaded and captured by the Indus and Ganges systems. This hypothesis is corroborated by the recent investigations which have established beyond doubt a marked westing tendency in the Sutlej and an easting tendency in the Jumna. The Hindu tradition which believes a mighty river, Sarsuti, to have once flowed across the Ghaggar Plain and later joined the Ganges at Allahabad has mistaken the shifting of the Jumna and its junction with the Ganges at Allahad for Sarsuti's. As such this tradition also supports this conclusion. (4) When the two important tributaries of the Ghaggar, the Sutlej and the Jumna, were respectively captured by the Indus and the Ganges and converted into their chief affluents the Ghaggar was reduced to the insignificant stream, it now is."

(Shamsul Islam Siddiqi, River Changes in the Ghaggar Plain, Madras, *Indian Geographical Journal*, Vol. 19, No. 4, pp. 139-146)

This observation is elaborated further by Lambrick: "On the opposite side, that is the right bank, there are traces of flood channels from old beds of the Sutlej, or it may sometimes have been the entire Sutlej River, joining the Hakra in three widely separated places. The furthest upstream and least distinct of these seems to have come in at Bhatnir, some twenty-five miles above the junction of the Chitang. Next in order, an ancient winding bed of the Sutlej, unites with the Hakra at Walhar (Fort Abbas), just within the border of Bahawalpur. This appears to derive from an old course of the Sutlej which flowed past Bhatinda and Malot, and its general alignment has been followed by the Hakra Branch Canal. The third of these connecting channels runs down from about 20 miles ENE of Bahawalpur City, and meets the Hakra near Kudwala. Its general direction has been followed by another irrigation canal, The Desert Branch; but we have been told that it was previously 'a large dry channel called Vahind, a feeder of the Sankara' (Buckley, R.B., 1893, *Irrigation Works in India and Egypt*. London: E. & S.N. Spoon.: 156). Thirty miles or so below this junction, in the neighbourhood of Derawal, the single wide bed of the Hakra seems to develop into a sort of delta of smaller channels." (Lambrick, 1964: 30-1).

"In northwestern part of Jaisalmer district, inspite of very low rainfall (less than 150 mm) and extreme conditions of the desert, groundwater is available at depth of about 50-60m along the course of the defunct (Sarasvati) river and a few dug wells do not dry up throughout the year. It is found that the area through which the river bed is traced supports vegetation even during summer. It is thought that these courses of river in the area still maintain their headwater connection and could form potential groundwater sanctuaries for exploitation. To confirm the scenario, an environmental isotope study was undertaken in collaboration with the Groundwater Department, Rajasthan in Jaisalmer district...The groundwater samples exhibit negligible tritium content indicating absence of modern recharge. Radiocarbon data suggest the groundwater is a few thousand years old. (uncorrected ages: 4950 to 4400 BP) with a velocity of about 20 m/a." (Rao, S.M. and Kulkarni, K.M., Isotope hydrology studies on water resources in western Rajasthan, *Current Science*, vol. 72,

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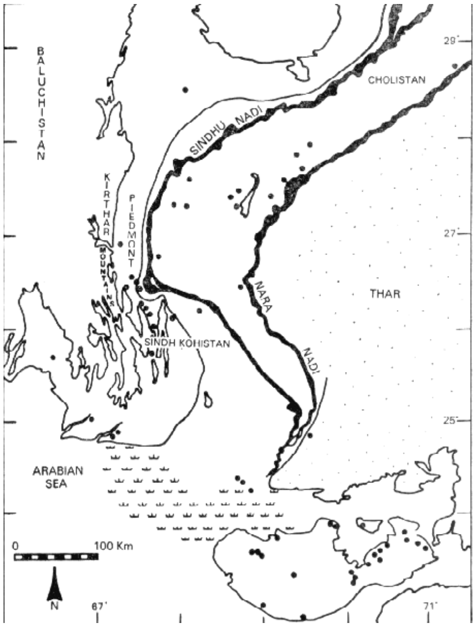
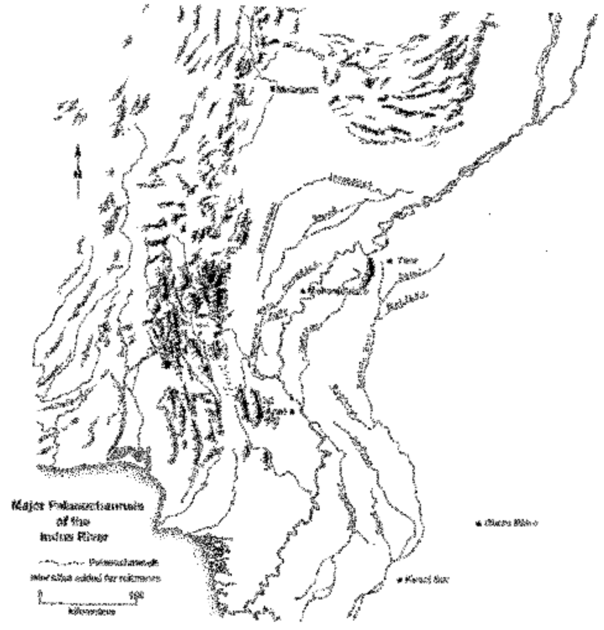
no. 1, 10 January 1997, pp. 55-61). A detailed account of former streams in the region is provided by Kar (Kar, A., 1992). Some of the buried stream segments are potential ground water aquifers.. The course of the Sarasvati to the west of Jaisalmer has an estimated reserve of about 3000 mcm water awaiting a judicious exploitation ...

Ghantiyal Ji is one of the five locations (around Jaisalmer) marked along a 60-km strip of land that is located above an ancient water channel, believed to be an isolated section of the Sarasvati around the area where it petered out into the desert in the time of its geological death throes. Experimental drillings have yielded sweet water just 30 m below the surface.

“Prehistoric settlement in Sind...The temporal priority of Amrian and Kot Dijian occupations to Harappan levels has been well established by excavations at the respective type-sites (Amri and Kot Diji), and qualifies them as pre-Harappan, or in Mughal’s terminology, Early Harappan (Mughal 1970). Although few in number, available radiocarbon dates (MASCA corrected) for this phase indicate a time span from about 3600 to 2500 BC (see Dales, George F., 1973, Archaeological and Radiocarbon Chronologies for Protohistoric South Asia, in: *South Asian Archaeology*, Norman Hammond, ed., pp. 157-169, London. Duckworth)...Indeed, the settlement pattern maps show a clear ‘movement’ of population through time from the Sind Kohistan and Kirtihar regions to the Lower Indus Basin from the end of the fourth millennium to the middle of the third millennium...

“Mughal’s (1980) recent explorations in Cholistan (along the now dry bed of the Hakra River), Bahawalpur District, Pakistan, have revealed a long history of occupation in the region beginning approximately with the fourth millennium. In this region, Mughal discovered 41 Kot Dijian-related sites...Semi-precious stones—agate, carnelian, chalcedony—occur in small





quantities in Sind Kohistan. Eastern Kutch is another source area for agates. Copper sources are known in Rajasthan, Kutch, Las Bela, Jalawan, and Sarawan in Baluchistan, and in eastern Iran. Steatite can be found in eastern Kutch and in south-eastern Iran...

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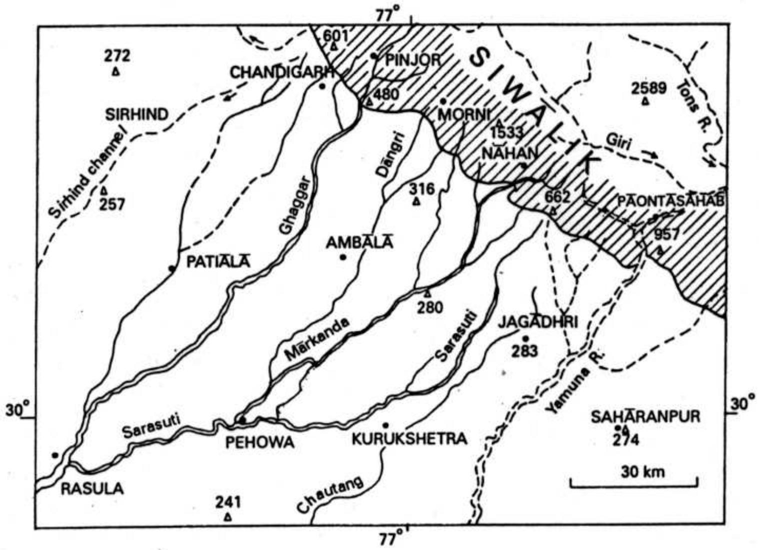
"The Harappan settlement pattern indicates a shift away from the western sources for the most widely and frequently used minerals, e.g., copper and stones, such as agate, carnelian, chalcedony, and steatite...The settlement pattern thus shifts to the northeast (Cholistan), the east (Lower Indus Basin), and the southeast (Kutch) to control more closely the exploitation of resources from their sources. The major exchange routes shift away from the hills in the west and onto the rivers and their plains to the east." ." (Louis, 1986, Recent explorations in Sind: paleogeography, regional ecology, and prehistoric settlement patterns (ca 4000 – 2000 BC), in: Jacobson, Jerome, ed., *Studies in the Archaeology of India and Pakistan*, New Delhi, Oxford and IBH Publishing Co., p. 82).

Speculations about River Sarasvati

History of ancient Bharat is being written by scientists whose investigations have yielded spectacular perspectives on the drainage system in north-west Bharat.

Doubts are cast on the dates when the migration of Yamuna occurred and also on the links with Sarasvati through the Chautang river course. One view is that the migration could be dated to the Pleistocene or the Early Holocene, based on the evidence of well developed terraces in the upper Yamuna. "Yamuna-like rivers, rising from the Himalaya, stopped flowing in the study area well before the Protohistoric period. This assessment is based on the lack of Yamuna type alluvium at a depth less than 8 m below the present day floodplain and especially by its absence below the Protohistoric sites. Alluvium deposited during the early Holocene, just below the Protohistoric period, was similar to the Ghaggar one." (Courty, M.A., 1989, Integration of sediment and soil information in the reconstruction of protohistoric and historic landscapes of the Ghaggar Plain, north-west India. In, Karen Frifelt and Per Sorensen, eds., *South Asian Archaeology 1985*. Scandinavian Institute of Asian Studies, Occasional papers No. 4: 255-59).



Dry channels of Sarsuti, its tributary Ma_rkanda, meet at Pehoa, downstream, the river is called Ghaggar. [KS Valdiya, 2002, Fig. 3.1]

Doubts are also expressed about the Sutlej having joined the Sarasvati by comparing the soil types of the Sotar (Hakra) which are fine, fertile alluvium and hence, different from the sandy silt of Sutlej: "The soil (of Sotar) is all rich alluvial clay, such as is now being annually deposited in the depressions which are specimens of these numerous pools which have given the Sarasvati its name, 'the river of Pools'; and there seems little doubt that the same action as now goes on, has been going on for centuries, and the numerous mountain torrents of the Indo-Ganges watershed, fed, not by the snows but by the rainfall of the Sub-Himalayan ranges,

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wandering over the prairie in many shallow channels, joined in the Sotra or Hakra valley and formed a considerable stream, at first perhaps perennial but afterwards becoming absorbed after a gradually shortening course, as the rainfall decreased over the lower Himalayan slopes, and as the spread of irrigation in the submountain tract intercepted more and more of the annual floods…" (Wilson 1884, quoted in Oldham, R.D., 1887: 334). Oldham argues that alluvial processes change over time and notes the presence of Naiwal branches of Sutlej in Bhatinda and neighbouring districts linking with Sarasvati. This observation is substantiated by the finds of three large Harappan sites: Lakhmirwala, Hasanpur Two and Curnikalan One. (Joshi, J.P., 1986, Settlement patterns in the third, second and first millennia in India—with special reference to recent discoveries in Punjab. In, K.C. Varma et al eds., *Rtambhara: Studies in Indology*. Ghaziabad: Society for Indic Studies: 134-39).

Maps show 'Dry Bed of Hakra or Ghaggar' run past Dilawar or Derawar in Bahawalpur State and down to Sind linking up with 'Raini N', which ran to a point close to E. Nara R. Nara River reached the Great Rann of Cutch at Ali Bandar.[See, e.g., *The Imperial Gazetteer of India,* XXVI, *Atlas,* new (revised) ed., Oxford, 1931, Plates 34 and 38.]

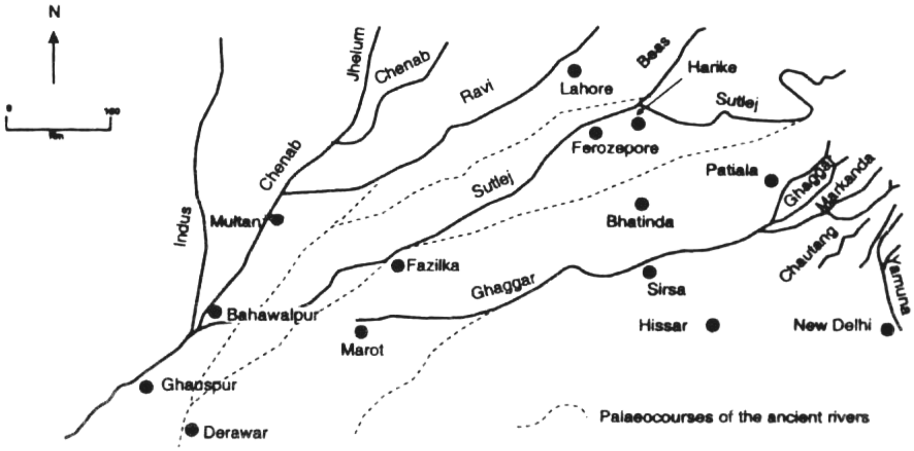

Fig.5. Shifting of Sutlej - Beas - Ravi courses.

Present day and ancient courses of Shatadru (Sutlej), Vipas (Beas), Parasuni (Ravi) (Sridhar et al. 1999).

A good example of historians' speculations about River Sarasvati (without referring to the well-documented and well-authenticated results of recent scientific investigations of geological and environmental sciences) is the surmise made by Irfan Habib that Sirsa river might have been the River Sarasvati mentioned in the Rigveda: "This river rises near Kalka, the railway station for Shimla, and runs northwestwards in a long valley with the Himalayan ranges on one side and the Siwaliks on the other. It finally joins the Sutlej, the great Himalayan river coming from the north. After the junction the latter pierces the Siwaliks above Rupar where it makes a great change of direction to flow almost due west. The tributary we are speaking of is a perennial river with a respectably long catchment area and, in its lower course, forms a broad channel, which still bears the name Sirsa. [See Survey of India, Quarter-Inch Sheets 53A (6th ed., 1952) and 53B (4th ed., 1946)]…Compare 'Sirsa' in Hisar district of Haryana, known until the fourteenth century as

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Sarsati.[Ibn Battuta travelled to Delhi from Ajodhan (mod. Pakpattan) on the Sutlej *via* Sarsati, 4 days' march from Ajodhan and producing excelent rice (H.A.R. Gibb, transl., *The Travels of Ibn Battuta, AD 1325-1354*, Indian ed., Delhi, 1993, III, p.617). The place is also mentioned as being near Hansi with the same spelling in Ziya Barani, *Tarikh-i-Firozshahi*, ed. Saiyid Ahmad Khan, W. Nassau Lees and Kabir al-Din, *Bib.Ind.*, Calcutta, 1862, p.556.] The Sirsa river too similarly enters 14th-century historical record as Sarsati. This occurs in the accounts of an attempt of Sultan Firoz Tughluq (1351-88) to cut through a hill in order to find a point of release for the river southwards. The contemporary work *Sirat-i Firozshahi* has a description of the Sultan's massive enterprise to capture the river ('Sarsati') for the plains; [Anonymous, *Sirat-i Firozshahi*, Bankipur Lib. MS, ff.38b-39a.] but the *Tarikh-i Mubarakshahi* (early 15th century) has a geographically more interesting account of what the project was about: "After some time he [Sultan Firoz] heard that near Barvar [?] there is a mound of earth. A river flows by [lit. through] that big mountain and runs into the Satuldar [Sutlej]. It is called Sarsati. This side of the hill is a stream called the Salima stream. [The Sultan] thought that if that earthen mountain is dug through, the river Sarsati would move into this stream and running to Sirhind, Mansurpur, and then to Sunam, would flow perennially."[Yahya Sirhindi, *Tarikh-i Mubarakshahi*, ed. M. Hidayat Husain, Bib. Ind., Calcutta, 1931, p.130.]… "Tughluq (he) cut another canal (*jui*, stream) from the Ghaghar and brought it to the fort of Sarsati [Sirsa] and from there he carried it to Harni Khera."[Yahya Sirhindi, *Tarikh-i Mubarakshahi*, p.129.] If the fort of Sarsati (modern Sirsa), to judge by its name, was on one of the old beds of the Sarasvati, Firoz must have run a channel from the Ghaghar into that bed and so joined the two streams." (Irfan Habib, 2001, *Imagining River Sarasvati: A Defence of Commonsense)*

Historian Irfan Habib errs in trying to extapolate the records of the historical periods into the 5th and 4th millennia BCE ignoring the presence of major archaeological sites on the Sarasvati River Basin: sites such as Rakhigarhi, Kalibangan, Ropar, Banawali, Kalibangan, Gurnikalan and Hasni (the last two sites in Bhatinda District which are twice as large as either Mohenjodaro or Harappa). His views also run counter to the evidence presented by KS Valdiya in his *Sarasvati: The River that disappeared* (2002). Of particular reference are the reference to Shatrana (60 kms. south of Patiala) where the width of the palaeo-channels of two streams joining there (palaeo-courses of River Sutlej and River Yamuna) is as wide as 20 kms.! The average width of the dry-bed of Drishadvati beyond Sirsa through Ghaggar-Hakra-Nara is 6 kms., an evidence of a substantial flow of glacier waters from the Himalayas to the Rann of Kutch. Habib also ignores the evidence presented by Sridhar, Merh et al on the three delta areas of the mouth of River Sarasvati east of Dholavira in the Rann of Kutch. The explanation offered by KS Valdiya that the course of Tamasa (Tons)-Giri-Yamuna could have been through the Bata River in the divide between Himalayas and Siwalik range before joining with the River Sarasvati is consistent with the evidence presented by plate tectonics of a lateral shift in segments of the Siwalik range. Yamuna tear near Paonta Doon valley explains the eastward migration of Yamuna River which was earlier a tributary of River Sarasvati through the Drishadvati stream. Considering that the civilization was essentially dependent upon the use of the water-ways to conduct exchange of resources and produced artifacts, the presence of sites on Kalibangan and Rakhigarhi on Drishadvati River can be explained as part of a river system which facilitated contacts between these sites and other sites of the civilization on the Sarasvati River basin. Another significant evidence ignored by Habib is that there are no archaeological sites on River Sutlej west of Ropar. This lends enormous weight to the arguments of Yashpal et al that the ancient courses of River Sutlej were indeed joining River Sarasvati at Shatrana through a south-ward course and that this course was deflected by 90 degree-diversion of the River Sutlej at Ropar, explained again as caused by plate tectonics. That there is no mention at all about the migration of

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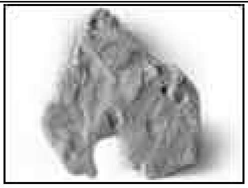
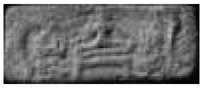
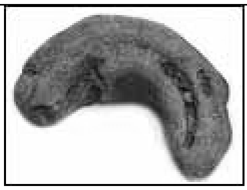
river courses caused by plate tectonics is a major omission in analyzing the overwhelming scientific evidence for a river which had flowed from Himalayas to Rann of Kutch (and beyond through Nal Sarovar) into Saurashtra, Gulf of Khambat and the Arabian Ocean, perhaps joining the ocean at Prabhas Patan. This latter surmise gains increasing validity – the Saurashtra coastline between Lothal-Rojdi-Prabhas Patan might have been at a lower elevation after circa 10,000 years ago -- based on the finds of submergence of palaeo-channels of Rivers Narmada and Tapati by the incursion of the sea and the formation of the Gulf of Khambat.

The river and the coast-line along the Gulf of Khambat, Gulf of Kutch, Makran Coast (Karachi), Persian Gulf constituted a veritable water-way for long-distance trade transactions and cultural exchanges starting from at least the seventh millennium BCE. The autochthonous evolution of a riverine, maritime culture is exemplified by s'ankha (*turbinella pyrum*, attested as an industry for making conch bangles, circa 6500 BCE north of Makran coast) with a habitat only in these locations, apart from Gulf of Mannar. (See S. Kalyanaraman, 2002, *Sarasvati*, Bangalore, Babasaheb Apte Smarak Samiti; Book review by Prof. KV Raman, in THE HINDU of May 1, 2001 http://www.the-hindu.com/2001/05/01/stories/13010179.htm).



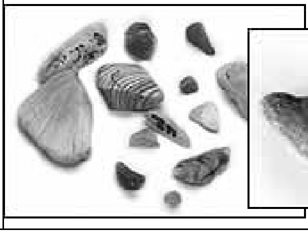
One find is a triangular sandstone tablet, shaped like an equilateral triangle about 6" at the base. At the apex, the head-dress of a seated person is faintly visible, since the slab is weathered by the sea waters; the entire composition is in carved in bas-relief. The orthography of the weathered slab is comparable to similar seated persons depicted on some inscribed objects discovered at Harappa and Mohenjodaro (m453B).

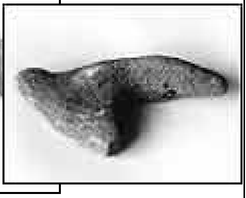




A human jaw-bone
Chert blade

Gem stones





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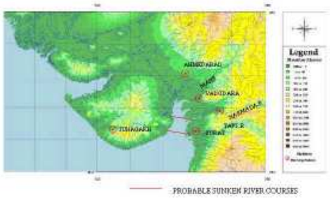
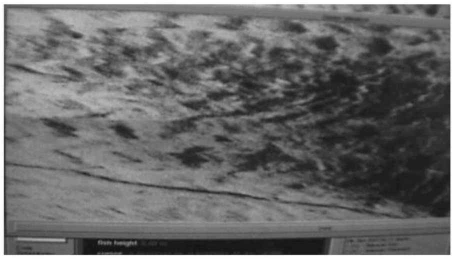
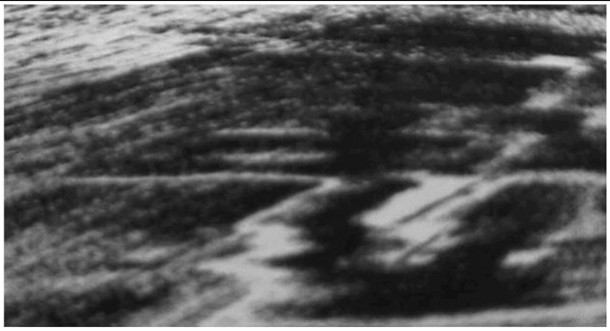
Location map of archaeological findings at Gulf of Cambay

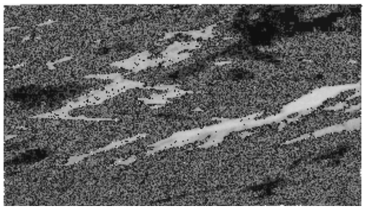




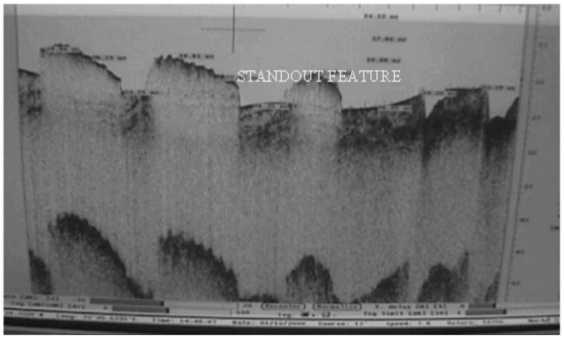
Sonogram of palaeochannel



Sonogram of 40m x 24 m tank like depression with steps leading into a deeper portion

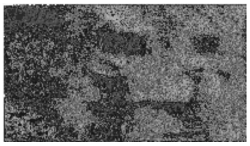


Sonogram of a major structure, 200 m x 45 m with rectangular platform like features



Sonogram of a buried structure 79 m x 50 m

Sonogram of a structure with wall like features, 41 m x 20 m with a relief of about 3 m above the seabed



This is the first record of possible prehistoric human discovered on the seabed at a depth of 20-40 m. below the present sea level, 20 km. Offshore of Hazira occurring south of Tapi mouth in the Gulf of Cambay…This prehistoric human activity of early Holocene age (Approx. 9500 years BP) on the bank of a sandy channel, probably represents a westward extension of the Tapi during the low sea level phase…The archaeological site was buried under fluvio-marine deposits around 8000 BP when the sea level started rising in the area, as a result of global glacio-eustatic changes.

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Gulf of Khambat Cultural Complex

Detailed underwater surveys carried out in the Gulf of Cambay, about 20 km west of Hazira, deploying side scan sonar and sub bottom profiler brought to light, the presence of a submerged palaeochannel traceable to a length of 9 km. Associated with this on either side are basement like features found in a grid pattern at water depths of 20-40 m. Sub-surface sampling carried out with dredge and grab sampler revealed stone artifacts, potsherds, hearth pieces, animal bones and human teeth embedded in fluvial sands and silts. In the upper part of the deposit, a carbonized wooden log was found and dated to around 9500 years BP by 14-c method. Marine magnetic survey carried out does not indicate the presence of any major metallic debris/objects. This appears to be one of the early records of prehistoric human activity of early Holocene age in the marine environment of India.

"...the Indian paleontologist M.R. Shani noticed silt deposits perched many feet above the level of the Indus plain near the city of Hyderabad in what is now West Pakistan. This and other evidence suggested to him that the area's ancient floods had not been mere river overflows but events on a far larger scale. Major tectonic upheavals, Sahni proposed, might have blocked the Indus River from time to time; each such stoppage would have caused the gradual formation of a huge upstream lake that might then have persisted for decades... Raikes's preliminary research not only suggests that the dam-and-lake hypothesis proposed 25 years ago by Sahni is tenable but also singles out an area near Sehwan, some 90 miles downstream from Mohenjo-daro, as the most probable area of tectonic disturbance affecting the city... Both the multiple layers of silt at Mohenjo-daro and the evidence of multilevel reconstruction suggest that the city was flooded in this prolonged and damaging fashion no less than five times and perhaps more... Could such a series of natural catastrophes, rathern than the Aryan invasion, have brought about the collapse of the Harappan civilization?" ((From: George F. Dales, 1972, The decline of Harappans, in: Scientific American readings: *Old world archaeology: foundations of civilization*, San Francisco, WH Freeman and Company, p. 160). Dholavira (Kotda), Rann of Kutch in relation to the ancient Sarasvati Delta (After Sridhar et al., Late Quaternary Drainage Disruption in Northwestern India, in: *Vedic Sarasvati*, 1999, Fig. 4, p. 196).

The Rann of Kutch and the Little Rann of Kutch are not deserts. They are stretches of sand leveled to an asphalt-like consistency by salty efflorescence and brine. The area remains waterlogged during monsoons and until the onset of winter. The area is dotted with low hills. The sandstones of the area constitute the veritable storehouses of underground water.

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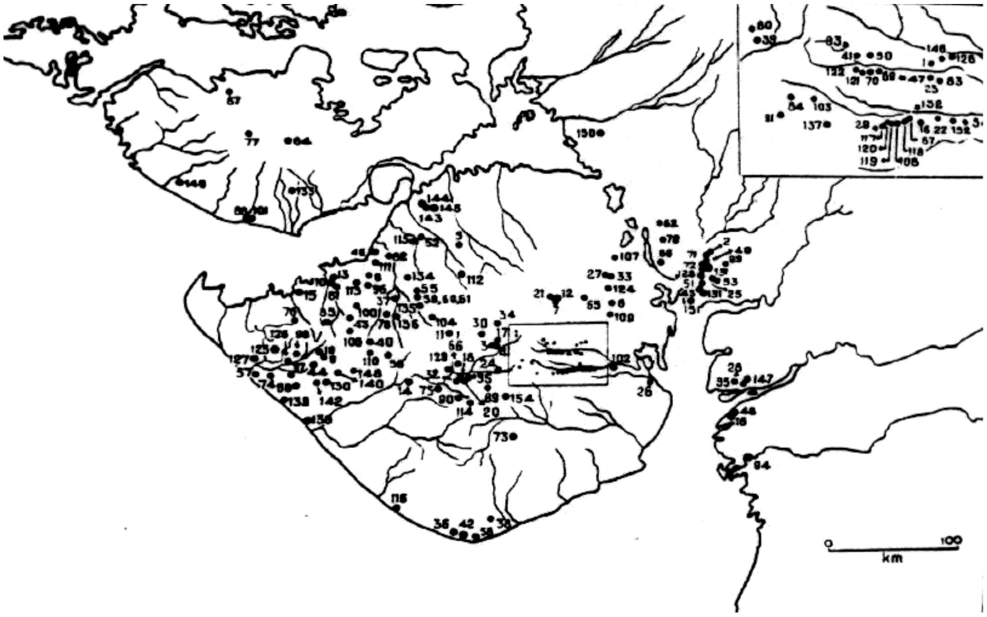
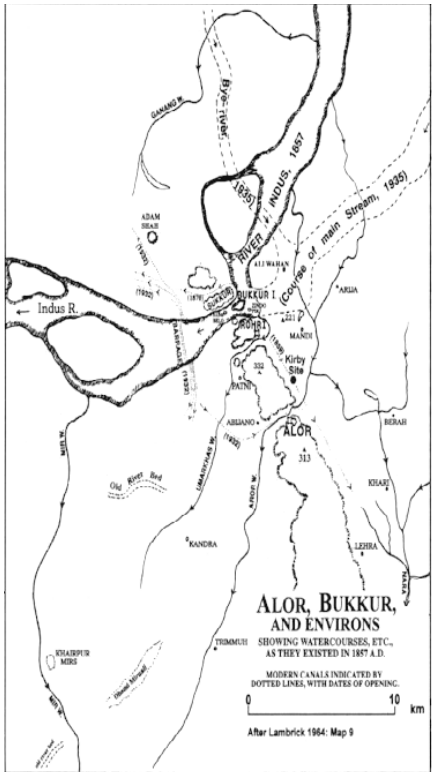
"A review of the regional archaeological assemblages indicates a cultural continuity, without stratigraphic break, demonstrating that the Harappan culture did not end abruptly, as was thought earlier (Possehl, Gregory L., Indus Valley Civilization in Saurashtra, New Delhi). Nevertheless, there was a change during the second millennium BC that led to the abandonment of cities like Mohenjodaro, Harappa, Lothal and many other Harappan sites. In Gujarat, the settlements of the Mature Harappan phase are few and far between compared to the large number of settlements of later phases... the settlements at Nageswar, Lothal and the sites in Kutch amply demonstrate that the settlements were developed mainly for trade and access to raw materials or to facilitate administration rathern than simply subsistence activities. The expansionist tendency on the part of Harappans towards resource areas is further substantiated by the discovery of Shortugai in the lapis lazuli producing region of northern Afghanistan (Frankfort, H.P. and M.H. Pottier, 1978, Sondage preliminaire sur l'establishment protohistorique Harappeen et Post-Harappeen de Shortagai, *Arts Asiatique*, 34: pp. 28-85)." (Kuldeep K. Bhan, Late Harappan Settlements of Western India, with specific reference to Gujarat, pp. 219-234 in: *Wisconsin Archaeological Reports* 2, 1989).





Sindhu River at Sukkur and old channels (After Lambrick, 1964: Fig. 9; Possehl, G.L., 1999, Fig. 3.120).

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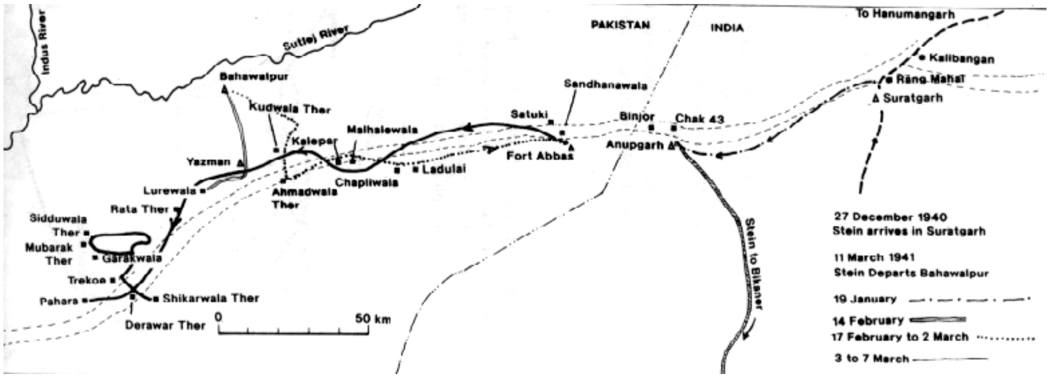
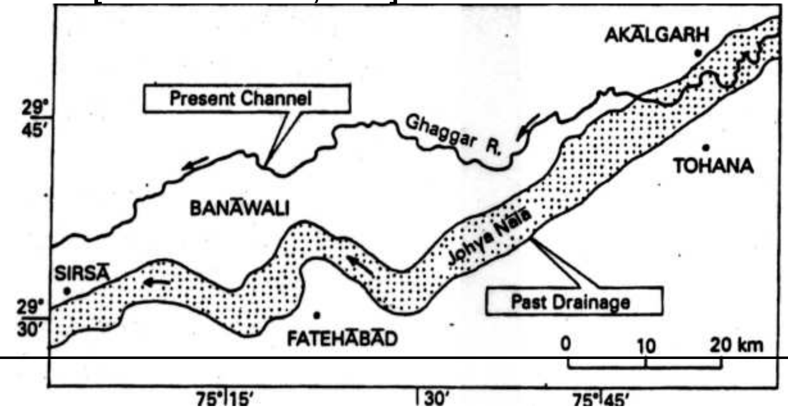
Some indologists have wrongly assumed that the reference of Sarayu in the following r.ca is to Hari Rud in Afghanistan; the argument is that: Sindhu (Avestan, Hindu) is Indus, Sarasvati (Avestan, Harakhvaiti) is Arghandab-Helmand, and Sarayu (Avestan, Haroiva), is Hari Rud.[The Avestan names are in the *Vendidad*, 1. Cf. Gherardo Gnoli, *The Idea of Iran*, Rome, 1989, p.55. Gnoli emphasizes the eastern-Iranian context of Avestan geography. Cf. Aurel Stein, 'Afghanistan in Avestan Geography', *Indian Antiquary*, XV (1886), pp.21-23; see p.22 for 'Haraeva' and 'Harahvaiti'.]



Aurel Stein's tour of Sarasvati (After Possehl, G.L., 1999, *Indus Age, The Beginnings*, Fig. 2.47).

Stein (1942), linked all the Harappan sites discovered along the old palaeochannel of Ghaggar to the ancient Sarasvati; by implication the palaeochannels of Ghaggar and Hakra, according to him, represented the ancient Sarasvati. (cf. Aloys Arthur Michel, *The Indus Rivers: A study of the effects of partition*, 1967, Yale University Press, New Haven.)

In middle reaches, Sarasvati (now represented by Ghaggar) was 6 to 8 kms. wide. The present-day course is also shown, close to Bana_wali, an archaeological site of Harappan period. [Sood and Sahai, 1983].



Aurel Stein, 1942, A survey of ancient sites along the `lost' Sarasvati River, *Geographical Journal*, 99: 173-182: `` ... the sketch-map based on the latest survey shows how great is the contrast between

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the very scanty volume of water brought down by the Ghaggar and the width of its dry bed within Bikaner territory; over more than 100 miles it is nowhere less than 2 miles and in places 4 miles or more. This bed is lined on both sides by dunes varying in height ... the Ghaggar bed above Hanumagarh, one notes that the number of mounds marking ancient sites long abandoned is here distinctly smaller than farther down the old river bed ... (mounds) known as ther or theri ... Archaeological facts prove cultivation, and with it settled occupation, to have been abandoned much earlier on the Hakra than on the Ghaggar ... trial excavation at Sandhanawala Ther, 3 miles to the north-west of Fort Abbas ... some sherds with incised characters which appear on many inscribed seals from Mohenjodaro and Harappa, chief sites of the Indus Valley cultre ... The great height and size of several others indicate prolonged settlement ... the evidence shows that down to historical times the Ghaggar carried water for irrigation under existing climatic conditions much farther than it does now. This makes it intelligible how the Sarasvati has come in hymns of the R.gveda to be praised as a great river ... upper portion of the ancient bed ... drying up during historical times ... hastened by diversion of flood water for irrigation brought about by more settled conditions and the resulting pressure of population. Lower down on the Hakra the main change was due to the Sutlej having in late prehistoric times abandoned the bed which before had joined the Ghaggar: the result of a law affecting all rivers whose course lies over alluvial plains ...

The dry bed of the Sarasvati River in Rajasthan is lined with sand dunes. "..that water once flowed well down to Bahawalpur is attested beyond doubt by numerous settlement-mounds, and it is often held that the East Nara in Sind is the continuation of the Hakra, beheaded by the Sutlej". (Spate and Learmonth, 1967: 536). The sand-dunes on the edges of the dry river bed do reprsent river-banks: "That they represent river-banks is proved by the existence on them of a large number of shells, kindly identified for me by the Zoological Survey of India as *Zootecus insularis* (Ehr.), *Indonaia* caerula (lea) and *Parreysia* sp. Some of these, being fresh-water shells, must have got deposited on the banks of the river when it was alive. Small dunes, accumulating at the tops of the sand-banks, and consisting of finer sand drifted from the banks themselves and outside, are of secondary formation." (Ghosh, A., 1952, The Rajputana desert: its archaeological aspect. *Bulletin of the National Institute of Sciences in India*, 1:37-42).

RV9.64-9: Let the great streams come with their mighty help, Sindhu, Sarasvati and Sarayu with waves. You Flood Divinities, you mothers, animating all, promise us water rich in fatness and in balm.

The use of the word 'sindhu' in this r.ca can as well be interpreted as a general appellation of a mighty river and hence an attribute of River Sarasvati. The r.ca can thus be re-interpreted as: "Let the great streams come with their mighty help of River Sarasvati and Sarayu with waves… You Flood Divinities, you mothers…"

'Harakhvaiti' is equated with Arghandab, a tributary of the Helmand (Avestan, Haetmant). Both streams are separately named in the *Vendidad*. It should also be noted that Helmand is a minor stream in a basin with little rain in the cathment area, does not flow into the sea, but ends an inland in a region of marshes and lakes (Hamun-i Helmand). Even assuming for the sake of argument that this interpretation is valid, it points to an Out of Bharat movement, moving northeastwards, away from the Sindhu!

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Before understanding the flow of River Sarasvati independent of the present-day course of River Sutlej (S'utudri_ as mentioned in the R.gveda), and independent of River Sindhu, it is apposite to review the recorded events in the recent evolutionary history of the River Sindhu (Indus).

``Evidence from many sources, including that of archaeological remains associated with old river courses, indicates that a major river, stemming mainly from the same sources as the present Sutlej, flowed through Northern Rajasthan, Bahawalpur and Sind-- to the southeast of the present course of the Sutlej and the Indus -- in the third to second millennium BC. This river, known as the Sarasvati in its upper course, at different times either joined the lower course of the Indus in Sind, or found its way independently into the Arabian Sea via Rann of Kutch." (Allchin, B., Goudie, A., and Hegde, K., 1978).

"...To C.F. Oldham (1874 and 1893) and R.D. Oldham (1886), two officers of the Geological Survey of India goes the credit of focussing attention on palaeo-drainage of northwestern India. C.F. Oldham as early as 1874 had given a preliminary account of the traces of a lost river in the Thar deser (Great Indian Desert). Subsequently, in 1893, he came out with a detailed paper, wherein he described the Rigvedic Sarasvati and speculated on the circumstances leading to its subsequent disappearance... C.F. Oldham (1893) reported the existence of a dry bed course of a great river within the sands, which once flowed across the desert to the sea. He has referred to this channel as Hakra which flowed through Bikaner and Bahawalpur into the Rann of Kach. This rive according to him represented the former course of Shatadu (Sulej) and the Sarasvati was a major tributary joining it. At some point of time when he Sutlej changed its course westwards to meet Beas and finally the Indus, its abandoned eastern arm viz., Hakra was left as a deserted channel...

R.D. Oldham, 1886, On probable changes in the geography of the Punjab and its rivers - a historico-geographical study, *J. Asiatic Soc. Bengal*, 55: 322-343: "... we have now seen that a dry river bed can be traced, practically continuously, from Tohana in Hissar district to the Eastern Narra in Sind ..."

R.D. Oldham (Deputy Superintendent, Geological Survey of India) provides a geologist's account in the earliest attempt to unravel the courses of the ancient Sarasvati River: "Of all the problems with which we are brought in contact when we try to unravel the ancient geography of India, none surpass in terest or difficulty thaose connected with the rivers of the Punjab and Sind. Both interest and difficulty result from the fact that, previous to the advent of English, all civilization and every invader have entered India from the Northwest, and tgheir difficulty from the changes that appear to have taken place in the courses of these rivers during the last three thousand years…

"The Lost River of the Indian Desert. We have lost sight of the dry bed of the old river Wandan in Lat. 28^0 16', Long. 70^0 33'. Above this comes a stretch of sixty miles in which the river bed has either been completely obliterated by the drifting sand or at any rate is not marked on the Revenue Survey maps of Bahawalpur, but in Lat. 28^0 46', Long. 71^0 25' we again find a dry river bed which, under the varying names of Hakra, Sotra, Choya, etc. can be traced through Bahawalpur, Bikanir, and the Sirsa districts till it is lost near Tohana in the Hissar district. Although the connection of these two dry river beds has not yhet been traced (unless we may take a passage— Notes on the Lost River of the Indian Desert, *Calcutta Review*, LIX, 17, (1874)—in the essay which has more than once been alluded to mean that the writer had personally traced the connection), there can be but little doubt that the two were originally continuous and are the sole remaining traces of

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that great river which, according to the traditions prevalent throughout the desert, once flowed through this now barren tract to the sea, or, according to other accounts, to the Indus at Sukkur…

"Another theory, propounded by an anonymous writer in the *Calcutta Review* (LX, 351, 1875) is that the Hakra was originally occupied by the Jamuna or a branch of it…but it is certain that it could not have done so since the time of Manu, who mentions Jamuna as joining the Ganges at the modern city of Allahabad; and I have shown that the Hakra was probably a flowing river at a later period than that…the most probable theory is that the anonymous essayist (C.F. Oldham, 1874, *Calcutta Review*, LIX, pp. 1-27)…who supposes the Hakra to be the old bed of the Sutlej, which previous to the thirteenth century, did not join the Beas, as it now does, but pursued an independent course to the sea…Mr. Wilson in his final report on the settlement of the Sirsa district…'From the appearance of the Sotar valley and the numerous remains of towns and villages which stud its banks all the way to Bahawalpur, it is evident that at one time it conveyed a much larger volume of water than at present, and probably was the channel of a perennial stream. But though it must have been, as it now, the largest and most important of all the drainage channels between the Sutlej and the Jamuna, it can never have carried a river at all approaching the size to either of these two. The valley is too shallow and shows too few marks of violent flood action for this to have been the case…

"The soil is all rich alluvial clay, such as is now being annually deposited in the depressions which are specimens of those numerous pools which have given the Sarasvati its name, 'The river of Pools'…and the bed of the stream is gradually attaining one uniform slope throughout'…I have quoted this passage as giving a clear statement of the nature of the objections raised, viz., the shallowness of the channel and the difference of its soil from the sandy silt found in the present bed of the Sutlej, and at the same time describing the manner in which it is even now being filled up with the alluvium precisely similar to the existing soil, and different from the sandy silt of the present bed of the Sutlej…

"Another objection which has been raised is, that the Sutlej flows in a depression below the level of the plain over which the Sotar pursues its course, and that neither it nor any of the dry river channels, to be mentioned further on, which communicate with it have been traced into connexion with the Sutlej…With regard to the second objection…rivers flow in places in a single well-defined deep channel, but in the other they spread out over a shallow ill-defined bed or even split up into several distinct channels…but lower down, where the river flowed in a deeper and better defined channel, the dry bed remains distinguishable and marks the former presence of the river…

"In the Vedas, the Sutlej is several times mentioned under the name of Satadru, but only in one case is it mentioned or supposed to be mentioned in connection with the Beas, and that is the 33rd hymn of the 3rd Mandala, where the confluence of the S'utudri and the Vipas is referred to…it would not prove that the Sutlej did njot pursue an independent course at a subsequent period, unless we could also prove that the present configuration of the ground, the distinction of Khadir and Bhangar, of strath and upland, existed in Vedic times…

"We have now seen that a dry river bed can be traced, practically continuously from Tohana in the Hissar district to the Eastern Narra in Sind…We have seen that the supposed mention of the confluence of the Sutlej and Beas in the Vedas is not conclusive; that, though Ptolemy seems to take the former river into the latter much as is now the case, yet, when we come to the time of the Arab invaders of India, we find a pecular nomenclature of the river, which points to the conclusion that

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the Sutlej can then only recently have become a tributary of the Beas and so of the Indus; and, moreover, we find a number of dry river channels, all of which lead from within a few miles of the present channel of the Sutlej, and ultimately join the dry bed of the lost river. Taking all these points into consideration, we may well conclude that this Lost River of the Indian Desert was none other than the Sutlej, and that it was lost when the river turned westwards to join the Beas…

"The Sarasvati of the Vedas. Probably the most difficult of all these problems relating to the rivers of Northern India is the persistent reference, in the Vedas, to the Sarasvati as a large and important river. It is impossible to suppose that rational beings would have selected the insignificant streamlet, now known by that name, whose bed contains no water for a large portion of the year, to associate it on equal terms with the rivers of the Punjab and the Indus, still less to exalt it above them all, to describe it as "chief and purest of rivers flowing from the mountains to the sea", or as "undermining its banks with mighty and impetuous waves." The only conclusion open to us is, then, either that there has been some great change in the rivers of this region, or that the Sarasvati of the Vedas has no connection with the insignificant streamlet which we now cal by that name.

"The latter of these two is the opinion adopted by Mr. E. Thomas (*JRAAS*, XV (new ser.), 1883, pp. 357-386) in an essay on the rivers of the Vedas. According to him, a part of the ancient Aryans, after leaving their native country at the headwaters of the Oxus, remained for some time in the valley of the Helmund, references to which were incorporated in their sacred hymns. After a while they were again compelled to migrate, and, on reaching the Punjab, tried to revive the seven rivers of their original home; unfortunately, however, there were only six large rivers, but the Sarasvati being a stram that lost itself in the lake or tank of Kurukshetra reminded them in a manner of the Sarasvati they had left behind them, the name was transferred to it, and the seventh river was found. In favour of this hypothesis may be mentioned the fact that, in the Zend, the Helmund is called the Harakhaiti, a word identified with the Sanskrit Sarasvati, according to the recognized rules of transliteration, but there is little else that can be produced in favour of this highly ingenious but far-fetched hypothesis. It implies an almost incredible degree of childishness in the ancient Aryans to suppose that they would confuse together a petty streamlet and a large, navigable river simply for the reason that the one ended in a large lake, while the other flowed into a tank of jhil.

"Rejecting the ingenious explanation of Mr. Thomas, there is no alternative but a considerable change in the hydrography of the region… The configuration of the ground west of the high bank of the Jamuna is that of a very broad and gently sloping cone; this is clearly shown by the general directions of the minor water courses west of the Jamuna, which, as a glance at a sufficiently large-scale male will show, radiate from the point where the Jamuna leaves the hills…The Jamuna must, consequently, during the period which geologists call Recent, have flowed sometimes into the Ganges and sometimes through the Punjab; but it is not possible for geology pure and simple to give the exact date at which the Jamuna last changed its course.

"Two of these now minor drainage channels, the present Sarsuti and the Chitang, are continuous with the Sotar, and die out after approaching within a fes miles of the old high bank of the Jamuna; and it is not impossible that one or the other may mark approximately the course of the Jamuna, or Sarasvati of the Vedic period.

"In this connection, a coincidence may be mentioned which is perhaps germane; when about the commencement of the century, the Brahmaputra, a sacred river like the Sarasvati, broke away from its old course and flowed west of the Madhopur jungle to join the Ganges, the new channel thus

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formed was immediately christened the Jamuna, a name it retains to this day, while the old channel now deserted by the main stream is still known as the Brahmaputra. Possibly, a similar explanation may be assigned to the name of the Jamuna, which, originally known as the Sarasvati, struck out a new course for itself during the Vedic period and doing so, acquired a new name. If this be so, the native tradition that the old Sarasvati joins the Ganges at Allahabad is, unwittingly, a true statement of fact. [This observation of Oldham gains credence by reviewing some semantics related to the word: there is a possible that the word, 'Yamuna', is derived from the root, 'yam' meaning ' to restrain, to guide towards (RV 1.84.6; 5.73.3; 9.44.5) with derivations such as yami_ = twin (RV 5.47.5); yamya = twins (RV 3.55.1); yamuna = restraining, governing (Vedic.lex.)

"The most weighty and indeed almost the only, argument that can be uirged against this hypothesis must be derived from the mention of both the Sarasvati and the Jamuna in the Vedas, and even in the same verse of the same hymn. It may have been, however, that the Jamuna, after leaving the hills, divided its waters…and that the portion which flowed to the Punjab was known as the Sarasvati whiel that which joined the Ganges was called the Yamuna…

"It may perhaps be thought that there is some inconsistency in thus claiming the Sotar first as an old course of the Sutlej and then of the Jamuna, but this is apparent, not real, for, as I have pointed out, the Sotar takes its rise where the fans of these two rivers meet, and must as soon as they were building up the deposits they are now excavating, have constantly been receiving a supply of water from one or other of the two. It so happens that the last change of course of both rivers, previous to that change of condition which led to their excavating the exting depressed channels, took the one into the Beas, the other into the Ganges, and a dry bed is all that remains of what was once a large river flowing through the fertile land.

"Conclusion. I have now shown that we may take it as proved that there have been great changes in the hydrography of the Punjab and Sind within the Recent period of geology, that there are abundant indications, not amounting to proof, that these changes have taken place within the historic period, and that the most important of them, by which a large tract of once fertile country has been converted into a desert, appears to have taken place after several centuries of the Christian era had sped. It is hopeless to expect an authoritative settlement of the question; the physical conditions cannot be said to favour the idea, but they are far from being inconsistent with so recent a drying up of the "Lost River of the Indian Desert".(R.D. Oldham, 1886, On probable changes in the geography of the Punjab and its rivers an historico-geographical study, *Journal of Asiatic Society Bengal*, v. 55, pp. 322-343).

Following R.D. Oldham's geological account of the hydrological changes in Northwest India which could explain the ancient courses of the Sarasvati River, C.F. Oldham provides a review of the earth science perspective from the evidence provided by the ancient texts. 'Sarasvati in the R.gveda. In the R.gveda we are told of a large and rapid river flowing from the mountains to the sea. The Maha_bha_rata described the same stream as losing itself in the sands. At the present day we find a river, wide and rapid during floods, but containing little water at other times, joining another stream of similar character, and thereupon losing its name, the river below the confluence being now called Ghaggar… We find (RV 7.95.1.2: "…Alone among all rivers Sarasvati listened, she who goes pure from the mountains as far as the sea. She who knows of the manifold wealth of the world has poured out to man her fat milk" With reference to this passage, Prof. Max Muller remarks: "Here we see Samudra used clearly in the sense of sea, the Indian Sea, and we have at the same time a new indication of the distance which separates the Vedic age from the later Sanskrit literature. Though it

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may not be possible to determine by geological evidence, the time of the changed course which modified the southern area of Punjab and caused the Sarasvati to disappear in the desert, still the fact remains that the loss of the Sarasvati is later than the Vedic age, and that, at that time, the waters of Sarasvati reached the sea."…Disappearance of Sarasvati at Vina_s'ana. In the R.gveda nothing is said of the disappearance of the Sarasvati in the sands. At the time of Manu, however, the waters of the sacred river no longer flowed to the sea. From the Maha_bha_rata we learn that "Baladeva proceeded to Vina_s'ana, wehre the Sarasvati has become invisible in consequence of her contempt for S'u_dras and Abhi_ras."…And in another place we find: "Here is the beautiful and sacred river Sarasvati, full of waters; and here is the spot known as Vina_s'ana, or the spot where the Sarasvati disappears. Here is the gate of the country of the Nisha_das, and it was from hatred of them that the Sarasvati sank into the earth, that the Nisha_das might not see her." From a reason being thus assigned for the disappearance it would seem to have been then recognized that there had been a time when the sacred stream did not lose itself in the sands. Although the Vedic accounts of the Sarasvati differ so much from those of less ancient authorities, and from the actual condition of the stream now known by that name, it is very unlikely that the river to which so important a position is assigned in the Brahmanical writings could ever have lost its identity, or that its name and sacred character could have been transferred to another and less considerable stream. Indeed it is tolerably certain that the Sarasvati of the present day is the river mentioned in the Veda and the Maha_bha_rata.

'Gap in the hills and the course of Sarasvati. The Sarasvati rises in the outer Himalayan range, usually called Siwalik, close to the watershed of Upper India, and not far from the gtap in the hills by which the Jamuna enters the plains…After a south-westerly course of nearly 100 miles, and after receiving its tributaries the Ma_rkanda and other streams, the Sarasvati now joins the Ghaggar near the village of Rasula. Although the river below the confluence is makre in our maps as Ghaggar, it was formerly the Sarasvati; that name is still known among the people, and the famous fortress of Sarsuti or Sarasvati was built upon its banks nearly 100 miles below the present junction with Ghaggar. How the sacred river came to lose its own name and acquire that of its former tributary is not known. It may have been owing to some change in its course in comparatively modern times. There is no mention in the Veda or Maha_bha_rata of any such river as the Ghaggar, or of any important stream between the Sutadru and the Sarasvati. The ancient fortress off Sarsuti or Sarasvati (now Sirsa) was a place of importance upto the time of the early Mahommedan invasions. Its site is marked by immense mounds rising some sixty feet above the plain. Some seven or eight miles to the eastward of Sirsa is another old bed of Sarasvati. This is partially obliterated, but it apparently joined the channel just referred to, not far from Sirsa. It may, however, have once been continuous with the old river bed, called in our maps as Chitrang…

'Why was Sarasvati lost?…The view held by several writers on the subject appear to be that it was owing to a shrinking of the stream caused by diminished rainfall. This, however, could not possibly have been the cause. It would have involved the existence, previously, of such meteorological conditions as must have rendered the holy land of the Brahmans an uninhabitable swamp…The neighbouring large rivers…some of them, in fact, which are mentioned in the Vedas as being fordable, are so with difficulty at the present day…Sarasvati, Ghaggar, and their tributaries…are fed by rain only; and not by the melting snows…

"It was not, then, owing to the shrinking of its stream that the waters of the Sarasvati lost themselves in the sands instead of flowing onwards to the ocean. Its ancient course, however, is continuous with the dry bed of a great river which, as local legends assert, once flowed through the desert to the ssea.

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In confirmation of these traditions, the channel referred to, which is called Hakra or Sotra (perhaps a corruption of Satroda or Satruda, the old name of the Sutlej; just as Hakra is a modified form of Sagara, Sankra, 'ocean') , can be traced through the Bikanir and Bahawalpur States into Sind, and thence onwards to the Rann of Kutch. The existence of this river at no very remote period and the truth of the legends which assert the ancient fertility of the lands though which it flowed, are attested by the ruins which everywhere overspread what is now an arid sandy waste. Throughout this tract are scattered mounds, marking the sites of cities and towns. And there are strongholds still remaining, in a very decayed state, which were places of importance at the time of the early Mahommedan invasion. Amongst these ruins are found, not only the huge bricks used by the Hindus of the remove past, but others of a much later make. All this seems to show that the country must have been fertile for a long period, and that ie became desert in comparatively recent times. Freshwater shells, exactly similar to those now seen in the Punjab rivers are to be found in this old river-bed and upon its banks…

"It is not beyond the bounds of possibility that the Jamuna may at some very remote period have taken a westerly instead of an easterly course and joined the Hakra; for, as observed by R.D. Oldham, of the Indian Geological Survey, this old river-bed lies between the fan or talus of the Jamuna, and that of the Sutlej…It would seem that the Sutlej has changed its course from time to time, until at last it joined the Beas, and the two streams flowed in the same channel. It is most likely that the legend related to the Maha_bha_rata, of the Satadru having separated into a hundred channels was founded upon some great changes in its course. The tradition current throughout the tract between the Sutlej and Sarasvati all agree that the Sutlej flowed in the Hakra channel, and that, till then, the country upon its banks was fertile and populosu…

"The Hakra is formed by the union, near Wallur, on the borders of Bikanirr and Bahawalpur, of two large branches. Each of these arises from the junction of several channels, most of them dry, or only containing a little water in the rainy season. In some of them, however, streams still flow for some distance. When the Sutlej changed its course to the westward, and abandoned the eastern arm of the Hakra, the Sarasvati, which had been a tributary, was left in possession of the deserted channel, in the sands of which its waters were swallowed up. It is of course impossible to fix any period for this change, but it may be presumed that it took place between the Vedic period and that of Manu, when we first hear of the disappearance of the Sarasvati in the sands…

'Rann of Kutch an estuary. It is not difficult to understand the formation of the Rann, if it be considered as the former embouchure of three important rivers (the Indus, Sutlej, and Luni) of which the first and the greatest has long abandoned it. The traditions of all the tribes bordering upon it agree that this expanse of salt and sand was once an estuary. And, as noticed by Burnes and others, places still exist up[on its shores which once were ports… Sufficient evidence has, I think, been brought forward to show that the Hakra did not dry up from diminished rainfall, or from any failure of its source, but that its waters, having ceased to flow in its ancient bed, still find its way by another channel to the sea. We have also seen that the Vedic description of the waters of the Sarasvati flowing onward to the ocean and that given in the Maha_bha_rata, of the sacred river losing itself in the sands, were probably both of them correct at the periods to which they referred.'(C.F. Oldham, 1893, The Sarasvati and the Lost River of the Indian Desert, *JRAS*, v. 34, pp. 49-76).

`` C.F. Oldham, 1893, The Sarasvati and the lost river of the Indian Desert, Journal of the Royal Asiatic Society, pp. 48-76: `` ... local legends assert (that Sarasvati) once flowed through the desert

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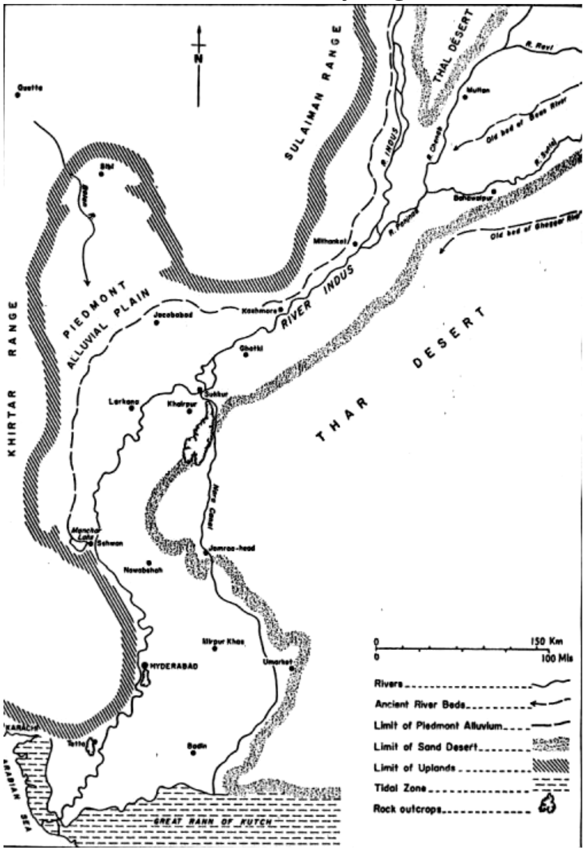
to the sea. In confirmation of these traditions, the channel referred to, which is called Hakra or Sotra, can be traced through the Bikanir and Bhawulpur states into Sind, and thence onwards to the Rann of Kutch... attested by the ruins everywhere overspread what is now an arid sandy waste. Throughout this tract are scattered mounds, marking the sites of cities and towns. And there are strongholds still remaining ...

"Amongst these ruins are found, not only the huge bricks used by the Hindus in the remote past, but others of a much later make ... Freshwater shells, exactly similar to those now seen in the PanjAb rivers, are to be found in this old river-bed and upon its banks ... After entering Sind the Hakra turns southward, and becomes continuous with the old river-bed generally known as Narra. This channel, which bears also the names of Hakra or Sagara, Wahind and Dahan, is to be traced onward to the Rann of Kutch... Tha Hakra varies in different parts of its course from about two to six miles in width, which is sufficient for a very large river ... The only river near Marot was the Hakra ...



The dried-up bed -- wadi -- of sarasvati might have constituted the great road between Hastina_pur and Dva_ra_vati_ (Dva_raka). Part of this road would have constituted the road from Sind to Delhi via Bahawalpur, Marot, Anupgarh, Suratgarh, Dabli, Kalibangan., Bhat.ner (Hanumgarh), Tibi and Sirsa suggested by Major F. Mackeson in 1844 to the British government (Report on the Route from Seersa to Bahawulpore, *JAS, Beng*., XLII, Pt.I, 1844, No. 145 to 153)]. A synonym of sirsa is sarsuti < sarasvati; at this place, about 100 miles below Rassauli, a fortress was built. Stein observes that Anupgarh had alternative names (Mathula Their and Mallavali Their) which indicate that a river was flowing plying boats: "The designation of Mallavali (the 'mound of the boatman'), suggests connection with the story about the ferry boats for which the Mathula ridge is supposed to have once served as a landing place…(another mound in the vicinity is called Jandewala and)…is supposed to have been named after the boatman whom local belief assumes to have taken his boat across the Ghaggar river from Juhanzwala to Mathula." (Stein, A., 1943, *An archaeological tour along the Ghaggar-Hakra River, 1940-42*. American Documentation Institute Microfilm No. ADI-4861: 71-2,76).

Reminiscing Balarama's pilgrimage along River Sarasvati

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A mighty river called Sarasvati drained in North-west Bharat and led to the dawn and evolution of a civilization with an unparalleled expansive area and which spanned over a period of two millennia between 3300 BCE and 1500 BCE.

River Sarasvati is adored in the R.gveda in 72 r.ca-s. Rishi Gr.tsamada uses the metaphors: **ambitame, devitame** (best of mothers, best of divinities) to describe the reality of the best of rivers (**naditame**). Vedic Sarasvati River is not myth; but *bhu_mi satyam*, ground-truth, she was a 1600 km. long river, with 6 to 8 kms. wide channels, she flowed from Manasarovar glacier in the Himalayas to Prabhas Patan (Somnath) to join the sindhusa_gara (Arabian Sea). One reference in the R.gveda describes thus: **giribhya a_ samudra_t**, 'from the mountains to the ocean'.

A war was fought on the banks of River Sarasvati. This is described in the *Mahabharata*. The text of this epic includes over 150 astronomical references; it has been demonstrated as explained in the appended note that one date is consistent with all these observed celestial events verily inscriptions on the sky observed by Veda Vya_sa; that date is about 3000 BCE, from the banks of River Sarasvati.

Balarama, elder brother of Kris.n.a goes on a pilgrimage along the Sarasvati River from Dwaraka to Mathura, after visiting Plaks.apras'ravan.a and Yamunotri (Ka_ra_pacava). During the pilgrimage, he visits many a_s'rama-s of Vedic rishis and offers homage to his ancestors. Balarama also offers ma_tr. tarpan.am at Pr.thu_daka (called Pehoa today) at the confluence of Rivers Sarasvati and Markanda. This pilgrimage center is celebrated even today as Ma_tr. Gaya together with Siddhapura on the banks of Little River Sarasvati which joins the Little Rann of Kutch in Gujarat.(Even at the time of the *Mahabharata*, the river was navigable for a distance of 1600 km. from Paonta Saheb thru Lothal/Dwaraka to Somnath (Prabhas Patan). The pilgrimage along the Sarasvati River is described in great detail in the s'alya parva of the Maha_bharata. So, our epics do contain valuable historical, geographical information of ancient Bharat.

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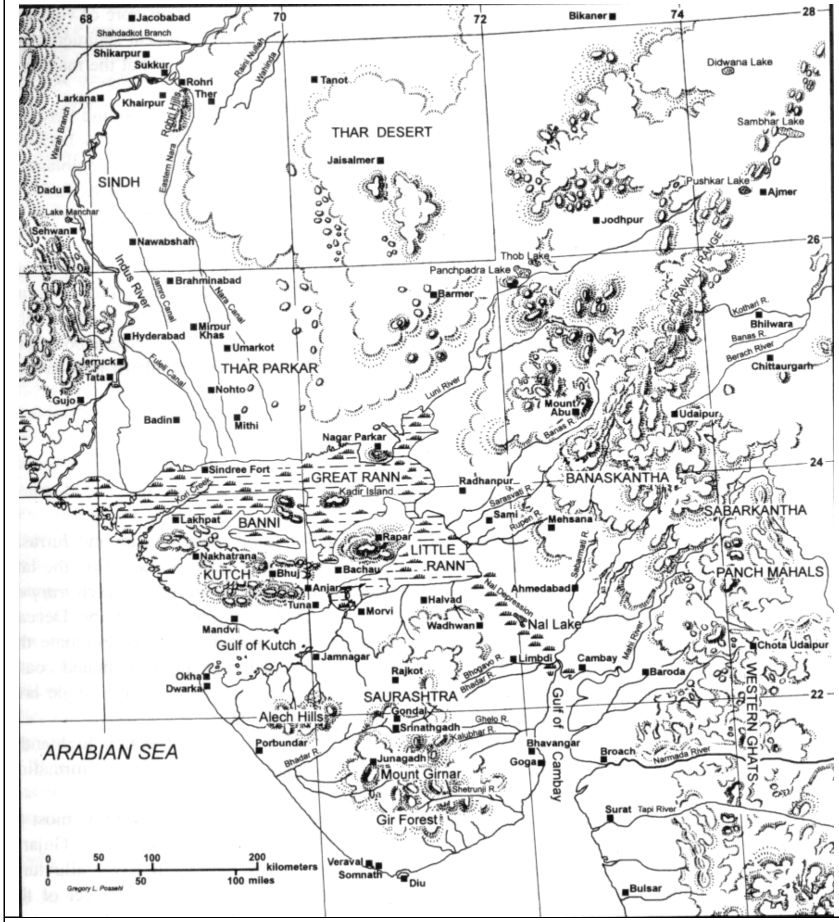
Map of Gujarat with the river systems and Nal lakes linking the Little Rann of Kutch with Lothal, which was linked with Prabhas Patan (Somnath) through Rojdi and Rangapura; there should have been a course of the Sarasvati River crossing Vallabhipur and Amreli; and Rangpur and Rojdi. (Map is drawn after R.N. Mehta, 1984, Fig. 26.1).. Nesadi, near Valabhi was excavated (Bhavnagar district, Gujarat); Valabhi was a capital city of Maitrakas from ca. 5th to 8th cent. A.D.



Prabhas Patan (Somnath); discovered near a warehouse is a stone steal with two stags engraved deeply (After M.K. Dhavalikar, 1984, Pl. 101). Early Prabhas culture was dated to ca. 1990 BC.

The story of the discovery of the Vedic River Sarasvati is matched in grandeur by the ongoing project to make the River flow again upto Gujarat. The work has already progressed upto Mohangar.h in Jaisalmer District in Rajasthan with a 40 feet wide and 12 feet deep channel which has helped stem the march of the Marusthali desert and has resulted in afforestation of the desert. The afforestation of Marusthali desert has started in 2002, thanks to the rebirth of Sarasvati. Sarasvati river will flow again, within the next five years, from Manasarovar to Sabarmati River in Gujarat when the interlinking of rivers projects gets completed soon.
Bha_ratam Janam

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Discovery of the most extensive civilization of 4th millennium, discovery of a mighty river of earlier millennia

A discovery of a civilization reported in 1924 resulted in rewriting the story of civilization, a paradigm shift in the understanding of evolution and chronology of Bharatiya civilization.
A discovery and rebirth of a great river which nurtured this civilization will result in a paradigm shift in the understanding of the indigenous origins and autochthonous evolution of Bharatiya civilization.

Equally stunning is the fact that this river which was desiccated in the waning phases of the civilization is now being revived thanks to the brilliant work done by scientists and engineers of Bharat. Indeed, the civilization did not die; it is within Bharat even today. The cultural markers of the civilization continue within Bharat. As the river flows again from Manasarovar glacier in the Himalayas to Sabarmati River in Gujarat, the historical fact dawns that the civilization did not fall after all. It continues to the present day in many facets of what may be called Bharatiya culture. A historical investigation has thus resulted in a developmental opportunity of unprecedented magnitude. Together with the rebirth of Sarasvati to drain north-west Bharat again, plans have been launched to create a National Water Grid which will result in bringing Brahmaputra waters to the central, eastern and southern regions of Bharat, upto Kanyakumari.

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Sarasvati Civilization

An overview

A historical project in search of River Sarasvati to discover our roots, has become a magnificent opportunity for national resurgence and to make Bharat a developed nation.

This is presented in three sections: observations, conclusions and areas for further research.

Observations

Many sparks have emerged from the anvils of scholars and researches of a variety of disciplines – all focused on the roots of civilization of Bharat.

Collated together, these sparks have become a floodlight which throws new light on the civilization of Bharat.

It is a new light on the civilization because of the following reasons:

A mighty river, a river mightier than Brahmaputra had drained in North-west Bharat for thousands of years prior to 1500 BCE (Before Common Era).

The collective memory of a billion people, carried through traditions built up, generation after generation, recalls a river called Sarasvati; this memory is enshrined in the celebration of a Mahakumbha Mela celebrated every 12 years at a place called Prayag where the River Ganga joins with River Yamuna. River Sarasvati is also shown as a small monsoon-fed stream in the topo-maps of Survey of India and in village revenue records in Punjab and Haryana.

Yet, the tradition holds that there is a triven.i san:gamma (confluence of three rivers). The third river is River Sarasvati. This tradition has now been established as a scientific fact – ground truth -- thanks to the researches carried out using satellite imageries, geo-morphological studies, glaciological and seismic studies and even the use of tritium analysis (of traces of tritium present in the bodies of water found in the middle of the Marusthali desert) by atomic scientists. The desiccation of the river was caused by plate tectonics and river migrations between 2500 and 1500 BCE.
These studies have established beyond any doubt that River Sarasvati was a mighty river because it was a confluence of rivers emanating from Himalayan glaciers; the River Sutlej and River Yamna were anchorage, tributary rivers of River Sarasvati. The river had drained over a distance of over 1,600 kms. from Manasarovar glacier (W. Tibet) to Somnath (Gujarat) with an average width of 6-8 kms. At Shatrana (south of Patiala), satellite image shows a 20 km. wide palaeo-channel (ancient course), at the confluence of five streams – Sutlej, Yamuna, Markanda, Aruna, Somb – referred to as Pan~ca Pra_ci_ Sarasvati in Bharatiya tradition. This becomes Saptatha Dha_ra Sarasvati when two other

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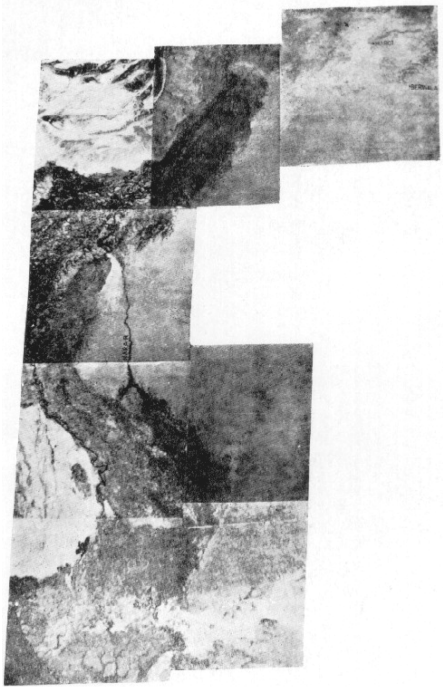
streams – Dr.s.advati and Ghaggar – join the River Sarasvati at Sirsa.

A civilization was nurtured on the banks of this River Sarasvati as recognized through the work of archaeologists and the geographical/historical facts contained in ancient texts of Bharat, such as the *Mahabharata* and *Pura_n.a.* This civilization was an indigenous evolution from earlier than 10000 BCE and can be said to be one of the oldest civilizations in the world, heralding the Vedic heritage.

LANDSAT composite; synoptic view of the river valleys of Sindhu and Sarasvati showing the possible course of the Sarasvati beyond Marot through the Nara into the Rann of Kutch. The Rann is conspicuous because of the high reflectance (white tone) of the encrustation. (After Yashpal, et al., 1980, Pl. 214 in Lal and Gupta, 1984).



Over 2,000 archaeological sites have been discovered in the Sarasvati River Basin. There is a description, in 200 s'lokas, in the S'alya Parva of Mahabharata of a pilgrimage undertaken by Balarama, elder brother of Kr.s.n.a, along the River Sarasvati from Dwaraka to Yamunotri.

Concentration of settlements on Sarasvati River Basin

Distribution of sites in States along the Sarasvati River Valley

Early Harappan (ca. 2500-2200 BC)	
Punjab	23
Haryana	103
Rajasthan	8
Total	**134**
Harappan (ca. 2200-1700 BC)	
Punjab	32
Haryana	44
Rajasthan	24
Total	**104**
Late Harappan (ca. 1700-1000 BC)	
Punjab	102
Haryana	297
Total	**399**

Note: The date for Early Harappan has been pushed back to ca. 3500 BC thanks to the excavations by Kenoyer and Meadow at Harappa in February 1999. Late Harappan is a dedvolutionary stage of the Civilization with a number of regional, variations; but, common heritage is shared, for e.g., a few inscribed seals and sealinga or potsherds, faience, agate and carnelian beads and bangles, a few terracotta cakes, balls and bangles, copper-bronze objects; sites were on small rivers, monumental structures had yielded to mud-brick or mud houses in small sites of 1 to 2 hectares.

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It is seen from this North-West India map that no Harappan archaeological sites are located in the arid belt of Rajasthan, near the salt-water lakes. Most of the sites are clustered around river banks. This map has been prepared taking into account the distribution of over 800 sites of various Harappan phases based on Jansen's analysis. (Jansen, M., 1980, Settlement Patterns in the Harappa Culture, in: *South Asian Archaeology*, H. Hartel ed., 251-269, Berlin: dietrich Reimer Verlag). Out of these 800 settlements, over 530 settlements are located on the Hakra-Ghaggar (Sarasvati) system. Adding 200 Harappan sites of the Kutch-Saurashtra region and 70 late Harappan sites of the Yamuna valley in Uttar Pradesh (mainly Saharanpur district), only about 100 sites are seen located on the Indus Valley proper and in Baluchistan.
A list of sites which are about 15 ha. in extent and with finds of inscriptions in the River Basins is short-listed, based on a hypothesis that size of a site is an index of urbanism.

1. This short-list is made out of a total of 2,600 sites of varying sizes,ranging from 0.05 ha. to 15 ha. (given in GL Possehl, 2000, *Indus Age: the beginnings*, Delhi, Oxford and IBH, pp. 727 to 845).

2.There is a remarkable clustering of relatively larger-sized site in the districts of Bhatinda and Bahawalpur.

3. Most of these sites are on the Sarasvati River Basin.
4. Out of 6 sites which measured more than 100 ha., four sites are located on the banks of the River Sarasvati: Lakhmirwala, Gurnikalan,and Hasanpur (all three in Bhatinda District, Punjab, India) and Rakhigarhi (Hissar, Haryana, India); these four sites on the SarasvatiRiver Basin and two other sites, Harappa (Sahiwal) and Mohenjo-daro (Larkana) on the left banks of River Ravi and River Sindhu (Eastern Nara Canal) -- i.e. the two sites, Harappa and Mohenjo-daro are accessible from the right bank of the River Sarasvati -- are also very close to the Sarasvati River Basin, with access to the mineral resources of Rajasthan, Gujarat, Badakhshan,Herat, Panjshir (Afghanistan), and Kirtihar/Salt Ranges:

5. Out of six sites which measured more than 100 ha., four sites are located on the banks of the River Sarasvati

Lakhmirwala (Bhatinda) [225 ha.
Rakhigarhi (Hissar) [224 ha.]
Gurnikalan One (Bhatinda) [144 ha.]
Harappa (Sahiwal) [100 ha.]
Hasanpur (Bhatinda) [100 ha.]
Mohenjo-daro (Larkana) [100 ha.]

Thus, the three Bhatinda district sites, and sites of Rakhigari, Harappa and Mohenjo-daro can be hypothesised to constitute the commercial hubs of the bronze age civilization.

6. Other sites ranging in size between 40 ha. and 81.5 ha. are as follows:

Ganweriwala (Bahawalpur) [81.5 ha.]
Kotada (Jamnagar) [72 ha.]
Nagoor (Sukkur) [50 ha.]
Nindowari (Jhawalan) [50 ha.]
Tharo Waro Daro (Sukkur) [50 ha.]
Mangli Nichi (Ludhiana) [40 ha.]

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7. Other 'urbanised' sites of sizes between 23 ha. and 49 ha. are:

Baglianda Theh (Bhatinda)
Bare Two (Bhatinda)
Budhel (Bhavnagar)
Butewala (Bahawalpur)
Chambrawala (Bahawalpur)
Chandnewala (Bahawalpur)
Dabar Kot (Loralai)
Daimabad (Ahmednagar)
Dalliwala One (Bhatinda)
Dalliwal Two (Bhatinda)
Datrana Eight (Banaskantha)
Derawar Ther (Bahawalur)
Devalio (Surendranagar)
Develiwala (Bahawalpur)
Dhalewan (Bhatinda)
Dholavira (Kutch)
Hirke (Bhatinda)
Judeijo-daro (Kachi)
Karanpura (Bhatinda)
Kudwala The (Bahawalpur)
Lathwala (Bahawalpur)
Lunida One (Bahawalpur)
Musafarwali (Bahawalpur)
Naru Waro (Khairpur)
Sihnewali (Bhatinda)

Could the site Sinewali (Dist. Bhatinda) be relatable to Sini_vali_of the R.gveda?

Harappan sites in North-West India, lakes in Rajasthan and the ancient river courses (After V.N.Misra, 1984, Climate, a factor in the rise and fall of the Indus Civilization—Evidence from Rajasthan and Beyond, in: B.B.Lal and S.P. Gupta, eds., *Fronters of the Indus Civilization*, Fig. 48.5; also: V.N.Misra, 1994, Indus Civilization and the Rgvedic Sarasvati_, pp. 511-525, in: *South Asian Archaeology 1993*, Helsinki).

Distribution of Harappan Sites in NW India

State	Early Harappan	Mature Harappan	Late Harappan	Total
Haryana	103	44	297	323
Punjab	26	37	129	147
Rajasthan	8	28	...	29
Chandigarh			4	4
Himachal Pradesh			3	3

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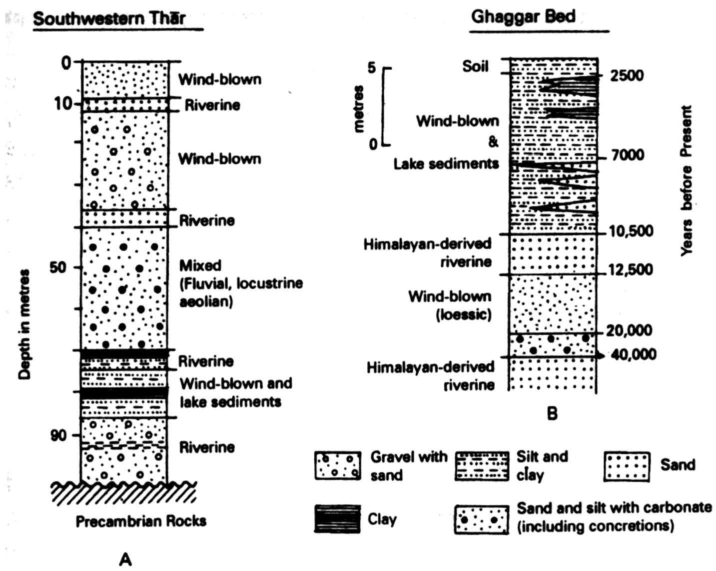
Delhi			1	1
Jammu	1			1
Uttar Pradesh		31	132	133
Gujarat		110	130	230

Note: Some sites were occupied during more than one period. 46 sites in Sikar District in the Aravalli Hills (Rajasthan) are excluded, which relate to the Ganeshwar culture, a variant of Harappan culture.

Relatively large-sized sites in Bhatinda District (Size in ha. shown in middle column):

Alida Theh
Alike 4
Alipur Mandran
Baglianda Theh 30
Bare
Bare Two 25
Bhikhi 9
Chhoti Mansa 9
Dalliwala One 25
Dalliwala Two 25
Danewala One 4
Danewala Two 4
Dhalewan 40
Gurnikalan One 144
Gurnikalan Two 16
Hasanpur Two 100
Hirke 25
Karanpura 25
Lakhmirwala 225
Lalianwali 4
Lalu Wala 4
Nahriwala 16
Naiwala Theh 16
Nehriwala Theh
Sahnewali
Sihnewali 25



11m. thick sediments in Sarasvati River Basin. Himalayan-derived sediments – 10,500 to 12,500 years Before Present -- occur in the Ghaggar (Sarasvati) channel upstream of Sirsa/ Kalibangan (Courty, 1995). These sediments are similar to that of Yamuna implying connection of Sarasvati and Yamuna (Raikes, 1968) Clay deposits in upper part of the succession of sediments (terminal phase of Sarasvati) denote lake formation by the river (After Singhvi and Kar, 1992).

The oldest extant human document is the R.gveda which is a compilation of 11,000 r.ca-s perceived by hundreds of seers. An understanding of this document is fundamental to an understanding of the cultural ethos of Bharat.

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R.gveda presents a world-view in allegorical and metaphorical terms perceiving an essential unity in cosmic phenomena and r.ta (a rhythm which modulates the terrestrial and celestial events alike). While the document presents the early philosophical thought related to *dharma*, it also describes the lives and activities of people – the Bharatiya. R.gveda thus presents a variegated picture covering a variety of facets of a maritime-riverine civilization, such as transport systems, agriculture, use of fire, minerals and metals to produce household utensils, ornaments, tools and weapons. Archaeologists have unearthed many examples of technology used in the days of the Sarasvati Civilization (from circa 3500 BCE to 1500 BCE). These provide evidence for the evolution of s'ankha industry in 6500 BCE, preparation of alloys such as pan~caloha, bronze, brass, pewter and bell-metal.

A dialectical continuum has existed in Bharat from the days of R.gveda and Sarasvati Civilization. The civilization constituted a linguistic area, as it is even today in Bharat. Mleccha was a language spoken by Vidura and Yudhis.t.hira as evidenced by *Mahabharata.* Mleccha were vra_tya-s who worked with minerals and metals. The semantic structures (words and meanings) of all languages of Bharat – Munda, Dravidian or Indo-Aryan categories – present an essential unity among the speakers of various dialects of Bharat. The seven volume work on Sarasvati substantially draws upon the *Indian Lexicon*, which is a comparative dictionary of over 25 ancient languages of Bharat.
Using this lexical repertoire of the linguistic area called Bharat, it has been possible to crack the code of the epigraphs of the civilization inscribed on over 4,000 objects including seals, tablets, weapons and copper plates. The epigraphs are composed of heiroglyphs (referred to as Mlecchita Vikalpa – picture writing --, one of the 64 arts listed by Va_tsya_yana).

> The code of heiroglyphs is based on rebus (use of similar sounding words and depicted through pictures) and represent the property possessions of braziers – possessions such as furnaces, minerals, metals, tools and weapons. These were also traded over an extensive area upto Tigris-Euphrates river valley in Mesopotamia and the Caspian Sea in Europe.

The tradition of epigraphy evidenced in punch-marked coins and copper plate inscriptions in the context of Sarasvati Epigraphs points to millions of manuscripts and documents remaining unexplored all over Bharat.
Desiccation of River Sarasvati is a warning to us about the unpredictability of the impact of tectonics on hydrological systems sourced from the Himalayas, for e.g. the Rivers Ganga and Brahmaputra.
Ongoing projects for the rebirth of River Sarasvati has opened a new vista in water management in Bharat, which has an ancient tradition of water management exemplified by the rock-cut reservoir in Dholavira, the grand anicut on Kaveri, the step wells and pus.karin.is in all parts of Bharat.

Conclusions

River Sarasvati is neither a legend, nor a myth, but ground-truth, a river which was flowing for thousands of years prior to Vedic times.
Bharatiya Civilization is an indigenous evolution and cultural continuity is established from the Vedic times to the present day.
For thousands of years before the days of Mahabharata War (ca. 3000 BCE), the Bharatiya had contacts with neighbouring civilizations.
The historicity of *Mahabharata* has been established making it a sheet anchoe of Bharatiya Itiha_sa.

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After the desiccation of River Sarasvati (finally by about 3000 years ago), Bharatiya-s moved to other parts of the world.

The metaphor of Samudra manthanam (celebrated in the *Bha_vata Pura_n.a*) is a depiction of the reality of a cooperating society which had united all the people of Bharat into life-activities including the environmentally sustainable use of natural resource offered by Mother Earth (Bhu_devi).

Sarasvati is adored in Bharatiya tradition as a river, as a mother and as a divinity – *ambitame, nadi_tame, devitame sarasvati.* This is an abiding spiritual foundation which resides in the heart of every Bharatiya.

The epigraphs evidence one of the early writing systems of the world.

The search and discovery of River Sarasvati has revealed a thread of essential unity – a bond among the people of Bharat. This has emerged from Vedic times and continues even today. This is the unity of an integral society, a resurgent nation and a unified culture which can be found in all parts of Bharat, from the Himalayas to the Indian Ocean.

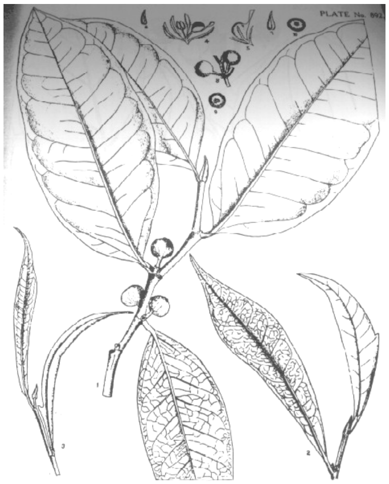
Research Institutions have to be established in different disciplines of historical studies to study the manuscripts and documents in the archival collections in all parts of the country.

The initiation of a project for interlinking of rivers is a laudable, first step in creating a National Water Grid which has the potential to ensure equitable distribution of water resources to all parts of the country and to make Bharat a developed nation in 15 years' time.

> The establishment of the Water Grid is a national imperative and should be an unmotivated action (*l'acte gratuite*) devoid of political overtones.

The establishment of an inter-disciplinary Sarasvati Research Centre in Kurukshetra will help in progressing further researches on water resources management, and study of our history, heritage and culture.

Areas for further researches



Plaks.a plant. *Ficus Gibbosa or infectoria or caulocarpa or caulobotrya or urostigma stipulosa* (After Basu, B.D., 1913, *Indian Medicinal Plants,* Pt. IV, Pl. 892)

Glaciological researches are needed in relation to the glacial source of River Sarasvati which is referred to as *Plaks.a Pras'ravan.a* in the ancient texts.

Seismological studies are needed to determine the chronology of events connected with the submergence of Dwaraka, the Gulf of Khambat and other coastal regions of Bharat.

Meteorological, glaciological and seismological studies have to be related to plate tectonics – the dynamic Indian plate and the evolving Himalayas – for a better understanding of the hydrological systems, sustainability and management of a National Water Grid for Bharat.

Archaeological work on the 2,000 sites on Sarasvati River Basin have to be related to the events described in the ancient epics: *Ramayana* and *Mahabharata*

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The Vedic texts, epics and Purana-s contain historical information.which can be validated through archaeological, astronomical and geographical studies.
Epigraphical and language studies in relation to the evolution and spread of languages and scripts of Bharat.
Scholars have to be encouraged to study the unexplored manuscripts lying in museums, libraries and private collections.
Researches for establishing the National Water Grid should be objective and provide a new vision to reach out the water and agricultural resources of the country, equitably, to all people and for the development of the nation.

Cultural Continuity

"If you seek a legacy, look about you," the Allchins rightly noted (Allchin and Allchin 1982: 333). Fairservis (1979: 302) stated it succinctly when he noted that "the answer to the question as to why the Harappan Civilization fell is that it didn't fall at all! It simply stood at the beginning of the mainstream of Indian culture and faded into that current, having brought to it acts of faith, class morality, aspects of technology, and perhaps a cosmology which heralded the eventual supreme achievement that was medieval India."

Bronze foot and bronze anklet: Mohenjo-daro [After fig. 5.11 in: DP Agrawal, 2000].

“In the style of wearing ornaments and amongst toilet objects there are quite a few instances which seem to have continued through the ages. For example, the Marwari ladies of Rajasthan wear a large number of bangles on their lower and upper arms reminding one of the manner in which the famous dancing figure from Mohenjodaro did (Marshall, 1931: Vol. III, Pl. XCIV, 6-8). An engraving on a stone stele found at Banawali (Bisht, 1987: 150) shows a person wearing a **d.amaru**-like armlet and wristlet, which reminds one of a similar ornament worn by women folk in Rajasthan and Gujarat. The anklet (**pa_yala**) worn by another figure from Mohenjodaro (Mackay, 1938, Vol. II, Pl. LXXIII,5) is still used by Indian women, sometimes disappearing from and at others re-emerging on the fashion scene. The gold hollow cone (called **chauk** in Hindi; Marshall, 1931: Vol. III, Pl. CXLVIIIA.2) is used even now on the forehead by the ladies of Rajasthan and Haryana. Referring to it Vats (1940:442) says: ‘By Hindus in northern India **chauks** are regarded as essential ornaments which every man, rich or poor, has to give at the wedding of his daughter-in-law. This ornament is now worn chiefly on religious and important domestic ceremonies only’. Reference may also be made to girdles worn by the Harappan terracotta figurines (mackay, 1938, Vol. II, Pl. LXV, 21,22). While girdles have almost gone out of fashion in urban areas, one may still see them around the waist of womenfolk inrural north India. Spiral finger-rings, though of a rather universal character, may not be out of place to be mentioned in the present context as well…” (BB Lal, 2000, Sarasvati Flows on, Delhi.)

Excavations at Adi Badri

Apart from the finds of metamorphic rocks from Central Himalayas on the terrace created by River Sarasvati, a s'ivamandiram has been found in one of the three archaeological sites at Adi Badri, Yamunanagar.

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Autochthonous evolution and continuity of culture

"There is no archaeological or biological evidence for invasions or mass migrations into the Indus Valley between the end of the Harappan phase, about 1900 BC and the beginning of the Early Historic Period around 600 BC." (J.M. Kenoyer, 1998, *Ancient Cities of the Indus Valley Civilization*, Karachi, OUP, p. 174).

Shaffer and Lichtenstein confirm the continuity of indige+nously evolved civilization. (1999, 'Migration, philology & South Asian archaeology,' in J. Bronkhorst and M. Deshpande, eds., *Aryan and Non-Aryan in South Asia*, Cambridge, Mass., Harvard Oriental Studies, 239-260). There is no genetic trait flow from Bactria into Bharat circa 1800 BCE: "Parpola's suggestion of movement of Proto-Rigvedic Aryan speakers into the Indus Valley by 1800 is not supported by our data. Gene flow from Bactria occurs much later and does not impact Indus Valley gene pools until the dawn of the Christian Era." (Hemphill and Christensen, "The Oxus Civilization as a Link between East and West: A Non-Metric Analysis of Bronze Age Bactrain Biological Affinities", paper read at the South Asia Conference, 3-5 November 1994, Madison, Wisconsin; p. 13). Kenneth A.R. Kennedy reaches similar conclusions from his physical-anthropological data. (K..A.R. Kennedy, "Have Aryans been identified in the prehistoric skeletal record from South Asia?" in George Erdosy, ed.: *The Indo-Aryans of Ancient South Asia*, p.49).

Bolan and Son Valleys in the Ganga basin have provided evidence of wild horse circa 18000 and of domesticated horse between 6570 to 5430 BCE. (G.R. Sharma, *History to Prehistory: Archaeology of the Vindhyas and the Ganga Valley*, 1980, Allahabad Univ.). This is confirmed by R.S. Sharma who finds evidence for domesticated horse at 5000 BCE and some circa 1000 BCE (*Looking for the Aryans*, 1996, Hyderabad, Orient Longmans, p. 17). The Rigveda (RV 1,62,18) refers to a horse with 34 ribs. There is no evidence whatsoever to assume that the word *as'va* in the Rigveda connotes only an *equus caballus* (Arabian horse) and not a pony native to Siwalik ranges. Sarasvati is compared to a *ratha: ratha iva br.hati_*, 'like a chariot big' (RV 6,61,13). The Rigvedic ratha is made of *s'almali* (RV 10,85,20), of *khadira* and *sims'apa* (RV 3,53,19) and the axle is made of *aratu* (RV 8,46,27). All these are heavy woods native to Bharat.

There is *no* reference to any shrinking of the river in any of the Rigvedic texts and certainly no textual basis to etymologize *samudra* of Rigvedic times, as a reference to lake(s). There could be other valid interpretations: 'The word *saras* came to mean 'pool' and this may refer to the sources of the river being lakes which formed as the ice was melting: considering the name was given when the river was at its grandest (from the mountains to the ocean), it would refer to lakes at the origin and not the terminal point…The root sr. and all its derivatives imply 'motion, extension, running-on'; *saras* too originally meant most probably (not 'pool' but) 'whirlpool' or 'eddy' in a river's current. Sarasvati was the river with the mighty current and strong swirls…Hymn 10,75…is a list of the rivers from east to west and Sarasvati is in the correct place, after Ganges and Yamuna. More important, hymn 3,33 speaks of the two rivers Vipas' and S'utudri as rising from the mountains (*parvata*) and flowing down to the ocean, *samudra*. Or should we here also take *samudra* to be a 'terminal lake', as Witzel would have it for Sarasvati in RV 7,95,2? In both we have the rise of the rivers from mountains and their flow to samudra. But RV 1,71,7 also says *samudram na sravatah sapta yahvi_h* '(sacrificial offersings turn to Agni) like the 7 mighty rivers flowing to the samudra': is this samudra too Sarasvati's 'terminal lake' into which turn/flow all seven rivers?…I find it more reasonable to take *samudra* as the 'ocean' and that Sarasvati also flows there.' (Kazanas, *Journal of Indo-European Studies*, 2002, p. 40).

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East to West movements

RV mandala 10, sukta 75 provides a list of river names, starting from east to west. "It is certain…that the *Rigveda* offers no assistance in determining the mode in which the Vedic Aryans entered India… the bulk at least [of the RV] seems to have been compiled rather in the country round the Sarasvati river" (Keith, A.B., 1922, 'The age of the Rigveda', *The Cambridge History of India*, Vol. 1, 79). Kazanas notes: "Several scholars indulge in semantic conjurings saying that various names in the RV refer to places and rivers in Afghanistan, Baluchistan, Iran etc., but this is is not a very honest practice since by such interpreting (turning facts into metaphors and symbols, and vice versa) one can prove anything." ('Indigenous Indo-Aryans and the Rigveda' in: *The Journal of Indo-European Studies*, Vol. 30, Number 3 and 4, Fall/Winter 2002, p. 8). Dtailed comments, establishing an east to west movement of peoples, are at http://hindunet.org/saraswati/dasyu.htm titled, 'Dasyu were left behind on the left (i.e. south).'

S'ankha (*turbinella pyrum*) was an industry which started earlier than 6500 BCE as attested by the find of a wide s'ankha bangle in the grave of a woman at Mehergarh. This industry continues even today in Gulf of Khambat and Gulf of Mannar.

Similarly, the ability to work with stones (large stones such as polished pillars and ring-stones for large buildings and small stones for ornaments) is also a skill which was evident at Dholavira (rock-cut reservoir, stone monitor lizard) and which continued in the historical periods in man-made caves. Stone-work required one tool: *t.a_n:gi*, chisel.

In the context of this cultural continuity into the historical periods, the epigraphs of the Civilization will be unraveled using the proto-Indo-Aryan Subtrate languages; these are the languages which have resulted in the formation of the languages of Bharat.

The civilization is noted for copper metallurgy, stone-bead making, and seal carving; some are also decorated with an early form of writing. By the middle of the third millennium B.C., a settled urban culture is evident and extensive trading contacts with cultures to the west and north-west. The decline of the Indus Valley civilization is attributed to the desiccation of River Sarasvati, which nurtured over 80% of the settlement sites, and loss of trade contacts.

Notes on Archaeological discoveries on Sarasvati River basin and contiguous areas (April 2003)

Archaeological Survey of India should be complimented for the initiative taken, during 2002-2003, to explore and excavate major sites out of over 2,000 archaeological sites located on the Sarasvati River basin, following the scientific investigations which have established the entire 1600 km. course of the river from Himalayas to Gujarat. Some of these sites, in the districts of Yamunanagar, and Kurukshetra on the banks fo River Sarasvati from Adi Badri to Pehowa (at the confluence of the river with River Markanda), are: Adi Badri, Bilaspur, Sadhaoura, Mustafabad, Bhagawanpura, Thanesar, Raja-karn-ka Qila, Mirzapur, Pehowa, Kalayat, Kaithal, in addition to sites such as

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Banawali, Rakhigarhi and Dholavira where excavation work is ongoing. Exploration and excavation work on hundreds of sites (out of a total of over 2000 archaeological sites on the river basin) will establish the cultural chronology of the Bharatiya civilization.

Intensive exploration work has started in about 40 ancient sites in the Sarasvati River basin in and around District Yamunanagar (Jagadhri), Haryana. The recent exploratory work (April 2003) has to be viewed in the perspective of other cultural sites on the Sarasvati River Basin, since the Sarasvati River constituted the water-way which united these cultural settlements into an indigenous evolution and continuity of Bharatiya civilization from over 5000 years Before Present to the historical periods. The heritage of Sarasvati Civilization and pre-history of Bharat is all around us.

An impressive find at Adi Badri Somb-Sarasvati left bank site is a copper/bronze coin inscribed on both sides. On one side, what appears to be a tiger or jackal is visible with a triangle depicted on the top register. This tiger image is reminiscent of the glyphs on Sarasvati Civilization seals and tablets. The image and epigraphs on the obverse are not clearly legible on the tablet or coin. Rebus interpretation: *kol* 'tiger'; *kol* 'metal"; *kol* 'smithy.

The find of a coin or copper tablet at Adi Badri is comparable to the Kuninda coin kept in the Himachal State Museum, Shimla, establishing the characteristic continuity of the Sarasvati Civilization (of Mature Harappan period) with the use of glyphs such as: a bull standing in front of a person with an upraised hand, Svastika, tree on hill range, tree on railing. This coin has an epigraph in Brahmi script.

Importance of Adi Badri

Adi Badri: Narayan temple on the left and Kedarnath temple on the right, on the foothills of Siwalik ranges

Adi Badri: A panaromic view of Somb-Sarasvati confluence on the foothills of the Siwalik ranges with a number of cultural mounds which are being explored and excavated

How to reach Adi Badri

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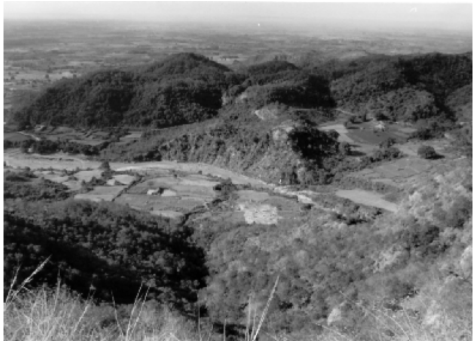
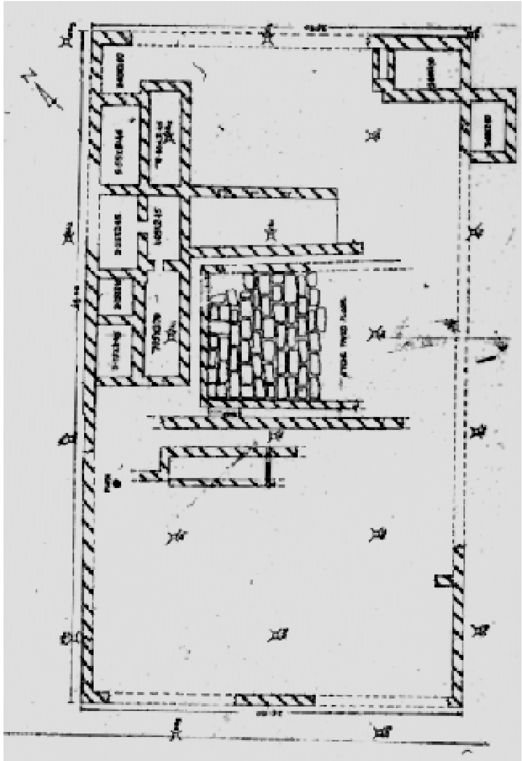
Adi Badri is located on the foothills of the Siwalik ranges and is a pilgrimage site renowned for the temples of Adi-Badri Narayana, Adi-Badri Kedarnath and Mantra Devi. Adi Badri can be reached by road via Bilaspur and Kapala-Mochan. The closest village is Kathgarh where a Sarasvati Cultural Information Centre has been established by ASI in the precincts of the Gram Panchayat Bhavan. A Sarasvati Darshan exhibition was held on the eve of Sarasvati Jayanti Ma_gha S'ukla Pancami



Adi Badri has three mounds which are being excavated. Two mounds (called ABR-I and ABR-II) are on the right bank of River Somb (a tributary of River Sarasvati), north of the U-bend and one mound (called ABR-III) is on the left bank.



ABR-I mound is locally called Simhabara. Excavation has revealed two cultural phases of bricks and stone respectively. "The exact nature and extension of these structures are in the process of being ascertained.The succeeding phasse of a single course stone wall was found in a very disturbed condition. The pottery recovered from the site includes red ware of medum to coarse

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fabric, and few sherds of buffware. The main shapes are bowls, basins, jars, cooking vessels, pitchers, handles, lids, knobbed lids, hukkas..."

ABR-II mound, Adi Badri

ABR-II. "It commands a panaromic view of the surrounding area and is locally known as Intonwali. The height of the mound is approximately 200 ft. and is situated on the right bank of the Sarasvati-Somb confluence. It was covered by thorny thickets and bushes. Excavation released a single cultural phase on this mound. A huge brick structure was exposed, which can be dated to about AD 1st c. to AD 300. Considerable amount of pottery was found from the area and is confined to red ware to medium to coarse fabric. The shapes include bowls, lids, miniature pots, jars,storage jars, globular pots, spouted and stamped wares etc."

Plan drawing of the excavated structure ABR-III

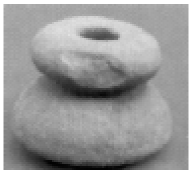
"ABR-III is located on the left bank of the Sarasvati-Somb confluence. Excavations revealed 2 successive cultural phases.

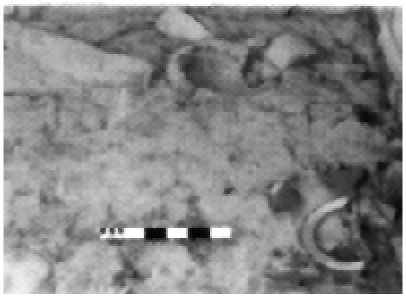
"Phase-I (AD 1st c. - AD 300). Remains of a spoked stupa was revealed. It is executed in burnt bricks and brickbats have been used as packing/filling material. The centre portion of the stupa has a rectangular chamber packed with earth and pebbles. The associated findings, antiquities and pottery all belong to the Kushana period."

The stupa with 24 spokes discovered at Adi Badri is comparabe to the cylindrical stupa of the Kushana period found at Sanghol (Dist. Fatehgarhsahib, Punjab), with three concentric rings of rick masonry with intervening space divided by radiating spokes of similar brick masonry at regular nervals. At Sanghol site, the core is made of a thick circular wall of brick masonry filled with earth. At Sanghol was discovered a carved lid of the relic casket with an inscription in Kharoshti script dated to circa 1st century BCE; the epigraph reads: **Upasakasa Ayabhadrasa**.

The discovery of the stupa in Adi Badri clearly demonstrates the overlap of Buddha and Bhairava traditions of Bharata of the early centuries of the historical periods.

"Phase-IIA. Structures made of undressed stone and rubble masonry, with thick clay mortar. Sometimes bricks have also been used.





Phase-IIB comprises of structures made of dressed stones. Though mostly clay mortar has been used, the use of lime mortar has occasionally been noticed. A huge complex was exposed with an enclosure stone wall (approx 48m X 26 m). Within this enclosure are a number of cells on two sides, at right angles. In the centre is a courtyard, paved with stones.

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"In the eastern wall are carved niches, at regular intervals. In one of the niches was found in situ, the sculpture of a seated Buddha in the Dharmachakrapravartana mudra. Along one of the adjoining walls of the courtyard remains of an anvil and what appears to be a round fire-altar with full of charcoal were found. The remains all point to some sort of ritualistic association. Antiquities include a terracotta Bull figurine (Nandi), remnants of a plaque, iron nails, spearheads, copper rings and fish-hooks, stone chaklas, beads etc. and carved architectural members in stone."

S'ivalinga has been found at Harappa, dated to ca. 3300 BCE. S'ivalinga terracotta images have also been found at Kalibangan. The worship of S'iva is a cultural identity of Bharat. S'iva shaped like the summit of Mt. Kailas exemplifies the water-giving Stone s'iva lin:ga found in Harappa and terracotta representations of lin:ga found in Kalibangan are metaphors, representing the shape of the summit of Mt. Kailas. The a_gama tradition of Bharat cherishes a metaphor of S'iva who sits in penance on the summit of Mt. Kailas. His consort is Pa_rvati, parvata putri_, daughter of the mountain. The mountain, the mighty Himalayan ranges – devata_tma_ himalaya according to the poet Ka_l.ida_sa -- is a reservoir, a veritable water tower holding life-sustaining, sacred waters, **a_pah**. As S'iva sits in penance, River Ganga emerges from the locks of his hair. It is a metaphor representing the flows of waters and alluvium into the plains of Bharat, sustaining a civilization.

S'iva lin:ga were found at Mohenjo-daro and Harappa. The religious tradition of S'iva worship is a continuing tradition in Bha_rata. [After Mackay, FEM, Pl. CIV, #27 and 28 and bases to hold the lin:ga, #24. and 25. The base #25 is engraved with tre-foil pictorial motifs, an apparent depiction of divinity associated with the lin:ga the base holds. Note the two matching holes on the base #25 and #28 to hold the lin:ga in position, using rivets.

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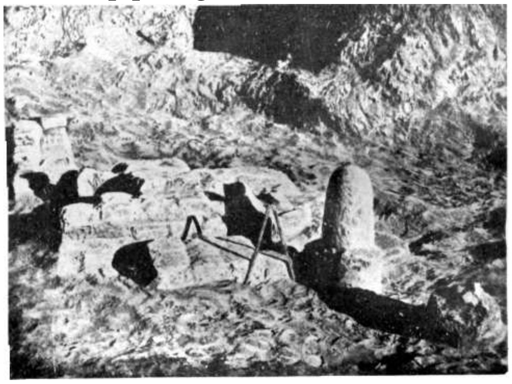
Plate X [c] Lingam in situ in Trench Ai (MS Vats, 1940, *Excavations at Harappa*, Vol. II, Calcutta): 'In the adjoining Trench Ai, 5 ft. 6 in. below the surface, was found a stone lingam [Since then I have found two stone lingams of a larger size from Trenches III and IV in this mound. Both of them are smoothed all over]. It measures 11 in. high and 7 3/8 in. diameter at the base and is rough all over.' (Vol. I, pp. 51-52)



S'iva linga is shaped after the summit of Mt. Kailas on the foothills of which is the Manasarovar Glacier lake which is the cultural capital of Bharat.

Kalibangan: Terracotta lin:ga. Mature Harappan (Courtesy ASI)

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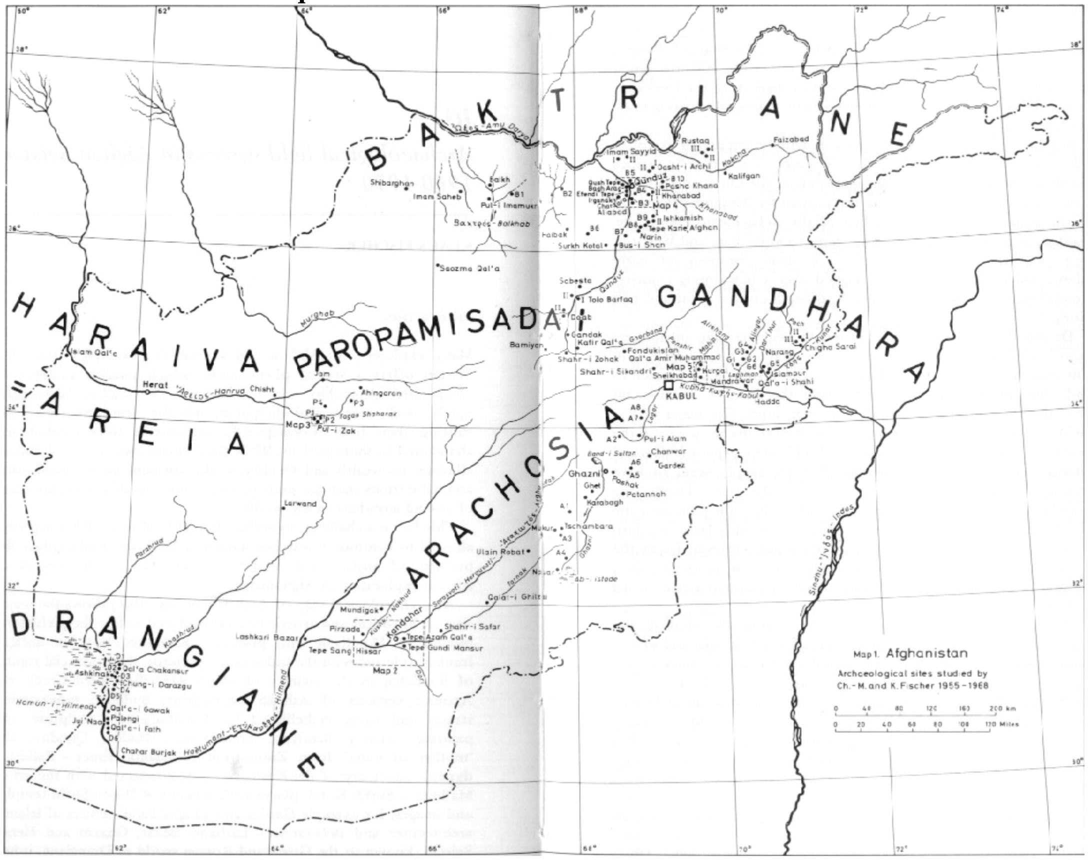
Archaeology, tradition and language:

From Sarasvati to Haraquaiti



Haraquaiti near Kandahar and Mundigak, joining the Haetumant (Hilmand) river; archaeological sites in Arachosia, Drangiane, Gandhara, Areia, Baktriane (After Fischer, K., 1970, Projecfts of archaeological maps from Afghan-Seistan between 31 20' to 30 50'N and 62 00' to 62 10'E., in Zentralasiatische Studien, No. 4, Wiesbaden; loc. cit., Fischer, Klaus, 1973, Archaeological Field surveys in Afghan Seistan 1960-1970, in: Norman Hammond, ed., *South Asian Archaeology,* Duckworth, London, Fig. 10.1). "Many explorers, MacMahon and Curzon for example, agree that Seistan offers a special phenomenon which puzzles students of comparative geography and archaeology. The shallow lakes alternately swell, recede and disappear and the rivers are constantly shifting their beds. Consequently settlements were created and abandoned in short periods. While the country owes to the abundant alluvium its wealth and fertility, it also contains more ruined cities and habitations than are perhaps to be found within a similar space of ground anywhere in the world...An archaeological map of Afghanistan shows the major sites of historical and artistic interest explored so far: the prehistoric mound of Mundigak with pottery ornamented both in ancient Iranian style and with the Indus valley patterns, the provincial capital of Kandahar in the vicinity of which were discovered Greek and Aramaic versions of Ashoka inscriptions; Buddhist monasteries, stupas and caves embellished by Gandhara-style sculpture and painting, namely Bamiyan, Fondukistan, Hadda, Qunduz; the 'mother of cities' from Zoroastrian to Islamic times—Balkh; a

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dynastic sanctuary of the Kushans to be connected with the art of MathuraSurkh Kotal; places with remains of Hindu-Shahi temples and images, for example Gardez and Chigha Sarai; centers of Islamic architecture and decoration—Lashkari Bazar, Ghazni and Heart. Seistan, known to the Greek and Roman world as Drangiane, is just being explored. The vast desert is covered by mud-brick remains. Moving sand dunes encircle old fortresses, like that of Sangar. Recently we have located prehistoric and early historic tepes, mounds and wall systems deriving from the periods of the Parthians, Sakas and Sasanians, and abandoned Islamic cities with soaring mud-brick walls and towers...Seistan was in prehistoric times a densely populated country...Seistan was crossed by Alexander the Great in the autumn of 330 BC...During the thirteenth and fourteenth centuries the inhabitants opposed the Mongol invasion, were conquered and totally destroyed. The irrigation works were wasted, the cities burnt and life seemed to end...The water of the Helmand was again used in canals and carried to distant points in the country; new canals were built and old ones repaired. Natural changes in climate and reduction of water supply seem to have restrained people from settling far from the river. Finally the population was forced to keep cattle and fields in the plain near the Helmand." (Fischer, Klaus, opcit., pp. 133-134).

It would appear that change of the Old Indic names into Iranian forms when they moved into the area may explain the following concordances: Sarasvati_ as Haraxvaiti, Sarayu as Haroiiu and Gomati as the Gomal.

In this context of faunal remains found in mesolithic sites in Rajasthan, it will be apposite to review a claim made by Alfred Hillebrandt that the early references to Sarasvati_ in the R.gveda should be traced to Sarasvati_ of Arachosia, which according to Hillebrandt is the 'western Sarasvati_' as distinct from the 'eastern' Sarasvati_ in located in Kuruks.etra. "The worshippers of Pu_s.an lived in the vicinity of the Sarasvati_…Book VI takes us to the banks of the western Sarasvati_ and book VII, on the other hand, to the area of Kuruks.etra, to the holy Sarasvati_ of the middle country. There at the Arghandab (Greek: Etymander) in Arachosia, Vadhryas'va's son Divoda_sa fought against the Pan.is, Pa_ra_vatas and Br.saya, and the river of the country "who consumed the Pan.is" (RV 61.1) stood by his side as a guardian deity. In the same book which thinks of the Pan.is with special hatred we see Pu_s.an "who pierces the Pan.is" at the center of the cult, and he is mentioned once in the Sarasvati_ hymn also (RV 6.61.6). Pu_s.an and Sarasvati_ occur side by side elsewhere too. 6.49.7 Sarasvati_; 8 Pu_s.an; 10.17.3-6 Pu_s.an; 7-9 Sarasvati_; 65.1 (Va_yuh) Pu_s.a_ Sarasvati_. Their association has been continued especially in liturgical texts. (cf. TS 1.2.2; 6.1.2.2: sarasvatyai pu_s.n.e 'gnaye sva_ha_; 5.5.12:…dha_tuh; sarasvatyai s'a_rih s'yeta_ purus.ava_k, sarasvate s'ukah s'yetah purus.ava_g, a_ran.yo 'jo nakula_ s'aka_ te paus.n.a_ va_ce…; MS 1.10.5 (145.16): sarasvaty eva sr.s.t.a_su va_cam adadha_t pu_s.an.am pratis.t.ha_m abhy asr.jyanta; va_vai sarasvati_, pas'avah pu_s.a_; Abr. 2.24.5: indrah pu_s.an.va_n, indrah sarasvati_va_n)…Goat and sheep-rearing flourished in the mountains of Afghanistan. Pu_s.an's chariot is drawn by goats and he weaves the woolen garment for the sheep. As the goat is sacred to Pu_s.an so is the ewe, mes.i_, sacred to Sarasvati_ at least in the ritual. (TS 2.1.2.6; S'Br 13.2.2.4; a ram in the Sautra_man.i_; TBr. 2.6.15.1). The R.gvedic period is familiar with the sheep-rearing in Gandha_ra, at the Sindhu and perhaps also at the Parus.n.i_. (Pischel and Geldner, *Vedische Studien*, II, p. 210). RV 1.126.7, the only passage which is more significant speaks of sheep-rearing, mentions a woman "who is hairy like the ewe among the Gandha_ris" (Zimmer, H., *Altindisches Leben*, pp. 30 ff., 229)…But the Sarasvati_ of Arachosia alone does not hold good for the entire RV. It is likely that the memory of this home of the Vedic clans is preserved in some single passages of the Bra_hman.a literature as well. But already the seventh book takes us to other surroundings, to the banks of the holy river in the inner India. (RV 7.96.2: 'When the Pu_rus seize

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both the andhas (on your banks) by force, then, you radiant one, be merciful to us as the friend of the Maruts and direct the favour of the mighty ones towards us'.(Geiger, *Ostiranische Kultur im Altertum*, p. 364 ff.)

AV 6.30.1:

deva_ imam madhuna_ samyuitam yavam sarasvatya_m adhi man.a_v acarkr.s.uh
indra a_si_t si_rapatih s'atakratuh kina_s'a_ a_san marutah suda_navah

The gods sowed at the Sarasvati_ barley mixed with honey over an amulet. Indra S'atakratu was the lord of the plough, the abundantly bestowing Maruts were the drivers. [Hillebrandt notes: "Here the stream is closely associated with the Maruts, and this is exactly the case in the R.gvedic verse (RV 7.96.2)…Pu_rus must have extended their territories upto the Yamuna_ and Parus.n.i_…The events described in books III and VII which take place mostly farther in the east on the Parus.n.i_, Yamuna_, Vipa_s and S'utudri_ make it improbable that the Sarasvati_ mentioned in RV 7.95, 96, on the banks of which the Pu_rus dwelt, can still be identical with the Arachotos.").

The reference to goats and sheep should not automatically link Sarasvati_ with Arachosia, Afghanistan, since faunal remains of goats and sheep have been found in the region close to Parus.n.i_, in North-West India, Rajasthan. It may not be necessary to postulate two Sarasvati_'s to explain the contextual references in Book VI and Book VII. The rationale for identifying Haraqaiti (arachotos) as the earlier, western Sarasvati_ is based on very flimsy grounds of rearing of sheep in Afghanistan. It would appear that sheep were reared in North West India, Rajasthan as well. Close to Parus.n.i_, in the Markanda valley, a lot of faunal material, dated as early as to the Pleistocene period, has been recovered from the Upper Siwaliks in general and the neighbouring areas in particular Mention has been made of frequent occurrence, about 2.48 million years ago, of *stegodon insignis ganesa, archidiskodon planifrons, elephas hysudricus, equus sivalensis, rhinoceros sivalensis, R. palaeoindicus, Sus spp., camelus sivalensis, cervus spp., colossochelys atlas, geoclemys sivalensis, crocodylus spp.* and a host of other new forms (Badam, G.L., *Pleistoceene Fauna of India*, Pune, Deccan College; S.N.Rajaguru and G.L. Badam, Late Quaternary Geomorphology of the Markanda Valley, Himachal Pradesh, in: B.P. Radhakrishna and S.S. Merh, eds., *Vedic Sarasvati*, 1999, Bangalore, Geological Society of India, p. 149). An alternative view is that the word Harakhaiti or harahvaiti itself traveled from India to Afghanistan, with the linguistic change of 's'a, sa and s.a' to 'ha', "as we proceed from the traditional region of Madhya des'a towards the west. To take only a couple of instances even now Sa_dhu is pronounced as Hau, S'ivaji as Hibji, Sukhdeva as Hukhdeva, Das'a as Daha and Sa_huka_ra to Hauka_ra in dialects of Marwar…The same process operated in the evolution of S'aryqan.a_ in the R.gveda later to Harya_n.a_…The consistent operation of this linguistic process of the replacement of sibilants by "Ha" thus justifies the conclusion that the name Sarasvati_ also logically underwent the same process in its westward journey and became Harahvaiti or Harkhaiti in Arachosia." (O.P. Bharadwaj, *Studies in Historical Geography of Ancient India*, Delhi, 1986, pp. 176-191; cf. *Vedic Index*, II, 364). The place name spelt as Taus.a_yan.a by Pa_n.ini changed to Tohana at some later stage. (V.S.Agrawal, 1974, *India as known to Pa_n.ini*, 2nd edn., Varanasi, p. 74). So, too the changes from asura to ahura (Isaac Taylor, 1980, *The Origin of the Aryans*, Reprint, Delhil, pp. 184-186). and Sindhu to old Persian Hindu (V.S. Agrawal, V.S. 2011, *Bharata ki maulika ekata_* (Hindi), Allahabad, p. 30f; Tola Frernando and Dragonetti Carmen, 1986, India and Greece before Alexander, *ABORI*, vol. LXVII (pts. I-iv), pp. 159-194)..

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“The linguistic evidence in the Vedic texts themselves points, of course, to a close relationship with the Iranian speaking tribes. However, it is not entirely clear where the combined Indo-Iranians lived together before they left for Iran and India, when they went on their separate ways, by which routes, and in what order. Furthermore, as G. Morgenstienrne (1975) has shown, the Kafirs or Nu_rista_ni_s constitute a third branch of the Indo-Iranians who were early on isolated in the impenetrable valleys of the Kunar and its tributaries.” (Witzel, M., 1995, Early Indian history: Linguistic and textual parameters, in: G. Erdosy, ed., *The Indo-Aryans of Ancient South Asia*, Delhi, Munshiram Manoharlal, p. 92).

The strongest evidence for the migration is the name of the Croatians who are a people mentioned in the Behistun inscription as Hravaits, a clear derivative from Sarasvati River Bank~Haraquaiti region, which link is logical in the context of the evidence of the earth sciences of the course of the 1600 kms. long Himalayan river called Sarasvati_. In the continuing search of the Indo-Europeans, the people of the Sarasvati_ River valley dated ca. 3500 BC are likely to be the oldest representatives who evolved and sustained a continuity of culture into the historical periods and into the present day civilization of India.

Both the terms, atharvan and navagva are used as synonyms in R.gveda. “...they (Atharvans and Navagvas) are credited with having entered a mountain pass (RV 1.112.18; RV 5.29.12), breaking mountain ranges (RV 1.62.4; 1.71.2; 4.2.15; 4.3.11), obtaining riches (RV 7.52.3), breaking mineral rich mountains (RV 4.2.15), winning cows (RV 1.62.2), and possessing miraculous powers (RV 3.53.7). These seers called Navagvas and Das’agvas are seven in number (sapta vipra_: RV 4.2.15) and reminding us of the number of stars in the constellation by their names. They are remembered as manes or pu_rve pitarah (RV 3.55.2: fathers of the old times who know the region; RV 9.97.39: our sires of the old who knew the footsteps, found light and stole the cattle), and are said to be conversant with the stations, padajn~a_ (RV 9.97.39). They are not only recalled in the course of overland journeys, but also during sea voyages (RV 8.12.2) spreading over ten months (RV 5.45.11).” (Bhagwan Singh, 1995, *The Vedic Harappans*, New Delhi, Aditya Prakasan, p. 198).

“There is no river of Afghanistan mentioned in the R.gveda which does not flow into the Indus. However, in a wider perspective, we find Afghanistan, South Central Asia, West Turkistan, Kazakistgan, (Azerbaydzhan) Iran (Mandas in western Persis, 2500 BC and Zarathustrians in central Iran), Turkey (Hittites in the second millennium BC), Syria, Palestine (Mitannis, 1400 BC), and Babylonia (Kassites, 1760 BC) related linguistically and commercially, directly and immediately to the Vedic Indians as well as the Harappans...No serious attempt appears to have been made for proper assessment of the relative position of Harappan traders in the contemporary world which, in view of the spread of Indo-Aryan languages and vestiges of their colonies in and around the great civilizations of West Asia, must have been hegemonic. Although linguistic testimony is meager, the impact on both Babylonian and Assyrian mythology and rituals as noted by competent authorities on the subject (Carnoy, Albert Jr., 1917, *Mythology of All Races, IV, Iranian Mythology*, Boston)...Afthanistan has been so thoroughly Aryanised that till the Greek times it was called A_rya_na_...Why is there no archaological evidence of the presence of Aryans in India? And the answer comes with a resounding echo: Because Harappan archaeology is hardly different from the Vedic one. We find almost the same geographical area occupied by the ‘Aryans’ as is covered by the material remains of the Harappans. Almost the same area is covered by the Indo-Aryans and Indo-Iranians abroad as was being explored and exploited by the Harappans for mineral wealth.” (Bhagwan Singh, 1995, *The Vedic Harappans,* New Delhi, Aditya Prakashan, pp.47-49).

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The identification of the Vedic Sarasvati River with the Indus or its tributaries on the right bank such as Argandab or Helmand is erroneous because in the Vedic texts, the upper course of Sarasvati is detailed as located between S'utudri_ in the West, a tributary of Beas (as also attested in a R.gvedic su_kta.) and Yamuna in the East, once upon a time; the Sarasvati river is also associated with the Maruts and is located close to a desert. The R.gvedic descriptions fit the Sarasvati_ river courses from where have been unearthed over 1200 archaeological sites (of the fourth and third millennium BC) of the bronze age of the Indian Civilization, including Rakhigarhi (150 miles north of Delhi, on the banks of the Sarasvati River; apart from the clusters of hundreds of sites in Bahawalpur province (north of Sind province), again on the banks of the Sarasvati River) which is about 220 ha., and hence, 3 times the size of Mohenjodaro in extent.

The finds at Mehrgarh dated to ca. 7000 BC indicate the early phases of village farming communities communities. Prof. Possehl provides a broad spectrum of phases related to the absolute chronology of the "Indus Age":

- Beginnings of Village Farming Communities and Pastoral Camps (Kili Ghul Mohammad and Burj Basket-marked phases) 7000-4300 BC
- Developed village farming communities and pastoral societies: 4300-3200 BC
- Early Harappan phases (Amri-Nal, Kot Dijian, Sothi-Siswal, Damb Sadaa) 3200-2500 BC
- Mature Harappan 2500-1900 BC
- Post-urban Harappan 1900-1000 BC
- Early Iron Age 1000-600 BC

(After Gregory L. Possehl, 1999, *Indus Age: The Beginnings*, New Delhi, Oxford and IBH Publishing Co., Table 1.2)

Evolution of Hindu Civilization and Vedic Culture: false Aryan invasion or migration theories

"The discovery of unburied skeletons among the latest levels of the Harappan occupation at Mohenjodaro combined with uncritical and inaccurate readings of the Vedic texts led some scholars to claim that the decline of the Indus civilization was the result of 'invasions' or 'migratgions' of Indo-Aryan speaking Vedic/Aryan tribes. (Wheeler, R.E. Mortimer, 1968, The Indus Civilization, 3rd edn., *Cambridge History of India*, Cambridge, Cambridge University Press). The invasion and/or migration models assumed that the Indo-Aryan speaking Vedic communities destroyed the Indus cities and replaced the complex urban civilization with their new rituals, language and culture. Many scholars have tried to correct this absurd theory, by pointing out misinterpreted basic facts, inappropriate models and an uncritical reading of Vedic texts. (Jarrige, Continuity and Change in the North Kachi Plain; Shaffer, Reurbanization: The Eastern Punjab and Beyond; loc. cit. Kenoyer, J., 1998, *Ancient Cities of the Indus Valley Civilization*, Karachi, Oxford University Press). However, until recentgly, these scientific and well-reasoned arguments were unsuccessful in rooting out the misinterpretations entrenched in the popular literature. (Brown, Dale M., ed., 1994, *Ancient India: Land of Mystery*, Alexandria, Va., Time-Life Books)...there is no archaeological or biological evidence for invasion of mass migrations into the Indus valley between the end of the Harappan

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Phase, about 1900 BC and the beginning of the Early Historic Period, around 600 BC. In Central Asia and Afghanistan the Bactria-Margiana Archaeological Complex (BMAC), dating ffrom around 1900 to 1700 BC, represents a complex mixture of nomadic and settled communities, some of these may have spoken Indo-Aryan dialects and practiced Indo-Aryan religion. These communities and their ritual objects were distributed from the desert oases in Turkmenistan to southern Baluchistan and from the edges of the Indus Valley to Iran. As nomadic herders and traders moved from the highlands to the lowlands in their annual migration, they would have traded goods and arranged marriages as well as other less formal associations resulting in the exchange of genes between the highland and lowland communities." (Kenoyer, J.M., 1998, p. 174).

Since Wheeler's hasty generalization, many discoveries have been reported which render it possible to reconstruct an indigenous and continued evolution and development of the civilization in the Sindhu Sarasvati River Basins. Outside these river basins, cultural complex of Bactgria-Margiana Archaeological Complex (BAMC) has been discovered. There is little evidence of cultural materials being transferred into or from this complex, though evidences of trade contacts have been identified. (Frederik T. Hiebert, 1994, Production evidence for the origins of the Oxus civilization, *Antiquity 68*: 372-87; Victor Sarianidi, 1993, Recent archaeological discoveries and the Aryan problem, in: *South Asian Archaeology, 1991*, Adalbert J. Gail and Gerd J.R. Mevissen, eds., Stuttgart, Steiner: 252-63). The internal migrations to the Ganga-Yamuna, caused principally by the desiccation of the Sarasvati River, have been well documented, with reference to new surveys and excavations of new sites. (Bisht, Ravinder Singh, 1987, Further excavations at Banawali, 1983-84, in: B.M.Pande and B.D. Chattopadhyaya, eds., *Archaeology and History*, Delhi, Agam Kala Prakashan: 135-56; Dikshit, K.N., 1991, The legacy of Indus civilization in North India, in: *Puratattva* 21: 17-20; Joshi, Jagat Pati, 1978, Interlocking of Late Harappan culture and Painted Grey Ware culture in the light of recent excavations, in: *Man and Environment 2:* 90-101; Shaffer, Jim G., 1993, Reurbanization: the eastern Puunjab and beyond, in: Urban Form and Meaning in South Asia in: Howard Spodek and Doris Meth Srinivasan, eds., *The Shaping of Cities from Prehistoric to Precolonial Times*, Washington D.C., National Gallery of Art: 53-67). Similarly, the migrations from Sind to Rann of Kutch and beyond, southwards towards the Saurashtra and Kathiawar regions of Gujarat have also been documented based on new surveys and excavations. (Bahn, Kuldeep K., 1992, Late Harappan Gujarat, in: *Eastern Anthropologist* 45: 1-2: 173-92; Possehl, Gregory L., 1992, The Harappan civilization in Gujarat: the Sorath and Sindh Harappans, in: *Eastern Anthropologist* 45:1-2: 117-54; Possehl, Gregory L., 1991, The Harappan cultural mosaic: ecology revisited, in: Catherine Jarrige, ed., *South Asian Archaeology, 1989*, Madison, Wis., Prehistory Press: 237-44). A review of these new discoveries and evaluations have led to the presentation of alternative theories to explain the decline of the Indus cities and the continuation of the urban Indo-Gangetic tradition. (Kenoyer, J. Mark, 1995, Interaction systems, specialized crafts and culture change: the Indus Valley tradition and the Indo-Gangetic Tradition in South Asia, in: George Erdosy, ed., *The Indo-Aryans of Ancient South Asia: Language, Material Cultgure and Ethnicity*, Berlin, de Gruyter, 213-57; Shaffer Jim. G, and Lichtenstein, Diane A., 1995, The cultural tradition and palaeoethnicity in South Asian archaeology, in: George Erdosy, ed., *The Indo-Aryans of Ancient South Asia: Language, Material Culture and Ethnicity*, Berlin, de Gruyter, 126-154).

R.gveda attests to the presence of organized armies, sena_:

The normal European method of archery is to use a number of fingers to release the arrow from the bow. A typical device used in ancient Bha_rata was a thumb-ring (made of agate, stag-horn, metal, wood, ivory, bone). A Bha_rati_ya archer's thumb was normally hooked around the bowstring.

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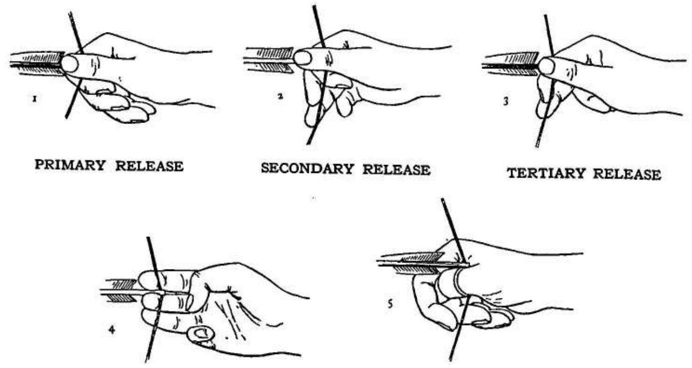
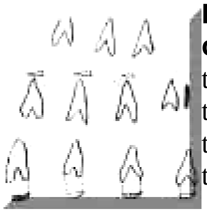
Since this technique brought tremendous presssure to bear on the thumb, the thumb-ring was a protection to relieve the pressure. The thumb-ring had one side much wider than the other. This was typically associated with Turkey, Persia and Bha_rata. It should be noted that the Chinese type was either cylindrical or D-shaped. The method of using the bow and arrow is a unique Bharatiya tradition and has no parallel in the European methods of archery. This is a conclusive evidence for the autochthonous evolution of traditions of **dhanurveda** in Bharat.

Methods of releasing the bow. Unique oriental method as opposed to the European method



The su_kta RV 6.75 is addressed to parts of battle by r.s.i pa_yu bha_radva_ja; (devata_: parts of battle):: 1. varma; 2. dhanu; 3.jya_; 4. a_rtni_; 5. is.udhi; 6. pu_rva_, sa_rathi_, utta, rays; 7. many horses; 8. ratha; 9. ratha gopa; 10. bra_hman.a, pitr., soma, dya_va_ pr.thivi_, pu_s.a_; 11-12, 15-16. is.u samu_ha; 13. pratoda; 14. hastaghna; 17. yuddhabhu_mi, Brahman.aspati, and aditi; 18. varma-soma-varun.a; 19. devabrahma



Harappa. After EJH Mackay. Thin, flat pieces of arrowheads made of copper having long barbs and without tangs. Wooden shafts over-lapped these arrow-heads, thus making a medial rib. Mackay notes that the tie-holes were to facilitate the insertion of wooden shafts. These arrowheads are identical to those from Zafer Papoura, Crete. Av. length: 1.19 inches, breadth 0.64 inches and thicknes 0.07 inches.

RV10.103.07 May Indra, bursting open the clouds with force; pitiless, heroic, with hundredfold anger, invincible, the overthrower of armies, irresistible, protect our armies in battles..r.s.i: apratiratha aindra.

The battles were fought not only with strangers but also with kinsmen. The decisive factor in identifying a foe is the failure to perform yajn~a. Sarasvati_ is invoked in battle; she is represented in the context of the five peoples who cherish her and of the saptadha_tu; this evokes the later-day association of Sarasvati_ with arts and crafts (or, technology in general) in the cultural tradition of Bha_rata. Indra successfully wields the powerful weapon, vajra, attacks the enemy Vr.tra who impounds the waters and enables the release of the waters. RV6.061.12 Abiding in the three worlds, comprising seven elements, cherishing the five peoples (of beings), she is ever to be invoked in battle. [Seven elements: saptadha_tu: either the metres or the river].r.s.i: bharadva_ja ba_rhaspatya; devata_: sarasvati_]

Prof. Konow argues that the extension of Indo-Aryan civilisation into Mesopotamai took place after the bulk of the R.gveda had come into existence. (cf. Winternitz, *History of Indian Literature*, Vol. I, p. 306, fn.2). R.gveda had come into existence on the banks of the River Sarasvati_ in Bha_rata. While the Rigveda is focussed on the processing of Soma in the context of acquisition of wealth, the ritual aspects seem to be dominant in Avestan and in the Bra_hman.as (perhaps due to the non-availability of raw materials for processing Soma and the disruption of riverine/maritime trade due

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to desiccation of the Sarasvati River), indicating that the practices of Avestan and Bra_hman.as are of a later date. Ga_tha_s of Avestan are contemporaneous with the Pura_n.as of the Vedic tradition in Bharat. Humbach suggests the date to 1080 BC for Zarathustra, primarily based on the classical Greek sources (which were earlier used to date Zarathustra to ca. 600 BC). (Humbach.H., et al., 1991, The Ga_tha_s of Zarathustra and the other Old Avestan texts. 2 vols., Heidelberg, Carl Winter Universitatsverlag, pp. 24-27).

The corpus of the Rigveda is emphatic proof of the settlement of Proto-Aryan Deva and Asura in the region around Kuruks.etra and upto Parus.n.i_ river. The evolution of the Avestan Ahura is apparently relatable to this locus of Northwest India, between the Rivers Sarasvati_ and Parus.n.i_.
It is, therefore, reasonable to surmise that as the Avestan tradition moved into the hinterland of Iran, the memories of life together were retained and a tributary of Helmand was called Haraqvaiti, in memory of the River Sarasvati_ of Northwest India. The Kavi who were left in India continued the Vedic tradition into the Bra_hman.a; the Kavi who moved into Iran continued the 'smithy' tradition and became chieftains. Zarathushtra's followers who were opposed to the 'kavi' remembered the Vedic Soma as Haoma and embellished it as a process of purification of a plant. The Rasa_ (evoking Soma rasa or potable gold-silver, electrum) became a mythical border river which separated the two peoples of Iran and India.

Avestan < Sanskrit

Hittite texts on horses and chariots, found at Bogaz Khoy (Hattussas ~ 1,300 BCE) show that the technology was Indian -- not Iranian. A hypothesis: Meluhhans and Vedics from the south-east, Elamites from the south-west meet with the steppes. Avestan emerges in east and west Iran.
The language of Avesta is concordant with Sanskrit, a language which has been essential in interpreting most of Avesta. Almost every Avestan word may be transformed at once into the equivalent Sanskrit word or vice versa by simply applying some phonetic rules, which has been the main contribution made by linguistic studies. Avestan inflexions are as rich as in Vedic Sanskrit. Sanskrit dipthong e_ appears in Avesta as ae_, o_i, e_. Thus, Av. vae_no_ite = Skt. ve_n-e_-te_. Sanskrit o_ is Av. ao, eu, as in Av. aojah = strength = Skt. o_jas. Avestan inserts epnethetic vowels, i,e,u as in: Av. bavaiti = Skt. bhavati; Av. haurva = Skt. Sarva = whole; Av. vaxedra = word = Skt. vaktra; AQv. hvare = Sun = Skt. Svar.

Burrow tries to provide a tortuous explanation for the etymologically related names found in Indo-Iranian borderlands with a sound change s>h. to indicate that Proto-Indo-Aryans settled in Iran and gave the names to the places using the sound shapes of the natives. Later, Iranian-speakers took over the names from the earlier Proto-Indo-Aryan population which by that time had migrated into Bha_rata. A straight-foward and simple explanation is that some Vedic speakers moved westwards from Bha_rata into and settled in the Iranian borderlands where the sound changes Sindhu - Hindu, Sarasvati - Haraxvaiti occurred over a period of time. [Burrow, T., 'The Proto- Indoaryans', *JRAS*, 1973, p. 126]. "While the names haraxvaiti_-/sarasvati_- and haro_iuua-/sarayu- refer to different localities in India and Iran, the Iranian and Indo-Aryan names hindu-/sindhu- refer to the same geographical entity (the Indus-river or the Indus-area). This implies that the Iranian sound change s>h had not been completed yet when the Indo-Aryans… named the river. [Szemerenyi, O., 1966, 'Iranica II', Sprache 12, p. 192f]." [Hintze, A., 'The migrations of the Indo-Aryans and the Iranian sound change s > h' in: Akten der X. Fachtagung der Indogermanischen Gesellschaft, Innsbruck, 22-28 September 1996, Innsbrucker Beitreage zur Sprachwissenschaft, Bd. 93].

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Avestan:	Sanskrit:
tem amavantem yazatem **su_rem da_mo_hu sevis'tem** **mitrem yaza_i zaotva_byo_**	**tam amavantam yajatam** **su_ram dha_masu savis.t.ham** **mitram yaja_i ho_tra_bhyah**

Some concordant words: Skt. yajn~a = sacrifice = Av. yasna; Skt. aryaman = god of hospitality = Av/ airyaman;; Skt. r.ta = truth = Av. OPers. as'a, areta-, ereta-; Skt. vipra = orator = Av. vifra; Skt. hotar = pourer = A:v. Zaotar; Skt. Soma = drink = Av. haoma; Skt. s'raddha_ = faith = Av. zrazda_; Skt. kavi = sage = Av. kavi; Skt. jaritar = singer - Av. jaretar; Skt. deva = god = Av. dae_va = false god, demon; Skt. druh = evil = Av. drug, drauga; Skt. dasyu = Av. dahyu; Skt. gandharva = Av. gandarewa; Skt. hva_tar = invoker = Av. zba_tar. [cf. H. Bailey, Veda and Avesta, repr. *University of Ceylon Review* Vol. XV Nos. 1 and 2, Jan-April 1957; B. Schlerath has compared Avesta and Sanskrit in Avesta-Dictionary entitled *Awesta-Worterbuch*, Wiesbaden, 1968; in Part II of this work are included a list of Vedic-Avestan parallels and concordances, with quotations from about 450 Vedic passages and 350 Vedic words).

Avestan concepts such as *asha* (truth, justice, order), *khshatra* (kingdom), *aramaiti* (humility, devotion), *ameretat* (immortality) and *haurvatat* (physical wholeness), are similar to ancient Indian views, *r.ta, kshatra, aramati, amrta* and *sarvatat.*

The unique characteristic of Indian value of ascetism – of being a vra_tya --, however, finds no place in Avestan. [See Solomon Nigosian, 1999, Zoroastrian Perception of ascetic culture, in: *Journal of Asian and African Studies*, February 1999, The Netherlands, EJ Brill p.4)
Hillebrandt (Vedic Mythology, 1981, vol.2 (repr.), pp. 270-271) provides some insightful observations pointing to the links between Vedic India and Avestan Iran:
"...I wish to limit my ask to making a beginning of the investigation in the hope that others would continue it. I give below predominantly such material where contacts with Iran can be assumed...TS 6.4.10.1: **br.haspatir deva_na_m purohita a_si_c chan.d.a_marka_v asura_n.a_m...(**MS 4.6.3 (81.1); S'BR 4.2.1.6)...In the course of the Agnis.t.oma both receive two Grahas, the S'ukragraha and the Manthingraha, which are late additions in the sacrifice...marka is the same as Avestan mahrka and denotes 'death'..s'an.d.a...recalls the name of the s'an.d.ikas, to be found among Indra's enemies...TMBr 7.5.20: us'ana_ vai ka_vyo 'sura_n.a_m purohita a_si_t (TS 2.5.8.5; S'S'S 14.27.1; Geldner, VSt, II, p. 166) **tam deva_h ka_madugha_bhir upa_mantrayanta tasma_ etak_ny aus'ana_ni pra_yacchan (Comm.: us'ana_ na_ma kaveh putrah asura_N.a_m virocana_di_na_m purohitah**...). Us'anas, whom the later Vedic texts associate with Indra a few times and make him a wise man and magician, is assigned here to the Asuras as the Purohita and likewise in the latter literature (MBH 1.76). Although etymologically somewhat different, he is not distinct from the most famous Iranian, Kai Ka_o_s, who is equated since long with the Kavi Kava usa..." (Cf. Spiegel, Die arische Periode, p. 284 ff.; Tiele, Geschichte der Religion im Altertum bis auf Alexander den Grossen, II, p. 72; Noldke, Grundriss der iranischen Philologie, II, p. 190, n.2. Contra Bartholomae, Altiranisches Worterbuch).

Indian Tradition: Kavi Us'anas in Pratis.t.ha_na

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As in Iran, so in India, all royal lineages are traced to Manu (Vaivasvata). Cognate names are: Manus.cihr (Manu Vaivasvata), Du_ro_srav (Dhr.s.t.a), Na_ri_man (Naris.yanta), Atrit (Sarya_ti), Racan (Rambha), As.k (S'ivi Aus'ina_ra), Kars.a_sp (Karu_s.a).

Among the r.s.is, the chronology of the Bha_rgavas is: Cyavana, Us'anas-s'ukra (called a kavi or kavi's son or Ka_vya), s'an.d.a and marka (apnava_na), u_rva. Us'anas-S'ukra is associated with the Daityas, Da_navas and Asuras (Pargiter, p. 194). S'ukra's wife was the pitr.-kanya_ Go, and they had four sons: Tvas.t.r, Varu_trin, S'an.d.a (or S.an.d.a) and Marka. S'an.d.a and Marka were priests of the asuras according to Vedic literature (both are called asura-raks.as, S'atapatha Bra_hman.a 4,2.1,4-6). Were Ma_rkan.d.eyas descended from Marka? In the Yajus, the As'vins drink before S'an.d.a and Marka. (TS 1.4.7-9; S'Br 4.1.5; 2.1; KS'S 9.9.20 ff; Yajn~es'varas'arman, A_ryavidya_sudha_kara, p. 86).

"Us'anas-S'ukra is connected rather with the central region of N. India, for Yaya_ti king of Pratis.t.ha_na (ALlahabad) met his daughter Devaya_ni_ near his own territory and married her; and Kapa_lamocana on the Sarasvati_ is called his ti_rtha...It seems probable that Ma_rkan.d.a is to be connected with Marka, son of Us'anas-S'ukra..." (Pargiter, pp. 196-197, 203).

Vra_tya[i]

Vra_ta of R.gveda were troops, the citadels of almost all Civilization sites such as Mohenjo-daro, Harappa, Dholavira, Banawali, Surkotada, Lothal, Banawali attest to town-planning including 'citadels'. The Sarasvati Sindhu Civilization had many industrial sites showing the use of fire to process mineral ores to make metallic weapons and tools and the use of other minerals to make utility and ornamental articles of faience, steatite, carnelian, turquoise and lapis lazuli. The smith and the lapidary, the mason and the trader, the blacksmith and the builder were the Sarasvati Sindhu people, comparable to the vra_ta of the Vedic cultural tradition.

The citadels or fortified settlements of the Civilization find their echoes in the forts built during the historical periods in Bha_rata. The Sarasvati and Sindhu River Basins are distinguished by the presence of many citadels or forts.

In a remarkable article, Louis Renou,1939, "La maison védique", *Journal Asiatique*], explains the "process of building" and "techniques of construction" of shelters made for domestic and ritual purposes. The *Sadas* hut is Prajâpati's belly. The *Udumbara* wood is strength (life-sap). When the *Udumbara* pillar is erected in the middle of the *Sadas* hut, one thereby places food, life-sap, in the middle. The central pillar of a house or of a sacrificial *Sadas* is identical with the axis mundi which is placed in the navel of the earth. "Renou looks first for "practical aspects of houses in the Vedic period" in a layer of texts on ritual (Gr.yasûtras) that in passing deal with "the rites that accompany house construction". From these he learns about materials - bamboo, thatch, straw mats, rope - ; orientation and organization; and process - post holes, binding, etc. He then tests his understanding of constructional terms and procedures by looking at a further set of texts that deal with the staging of sacrifice and ritual (Shrautasûtras), where sheds and huts used in ritual performance are described. "In spite of their special role, these shelters provide valuable information concerning the process of building". Some of these sheds shelter priests, the sacrificial platform, or chariots. He finds in the descriptions given in these texts additional practical terminology for roof systems, cross-beams, etc., and in the directions and timing of ritual some confirmation of the processes of construction." (From the Preface by Michael Meister).

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Renou, however, does not expand on the use of the terms, 'harmya' and 'gra_ma' which provide a wider basis for understanding the nature of the houses and settlements in which R.gvedic people lived.

'Vrata' is used as a generic designation for 'people' and with particular reference to 'guilds' as in the use of the word, 'nigama' linked with 'gra_ma'. It may be postulated as a hypothesis that the term, 'vrata' connoted the set of settlements which were fortified and where the a_yudha-ji_vi-s and armourers lived in a ha_rmya, where the fire-places abounded to smelt mineral ore; the later-day association of 'vrata' with 'ma_gadha' also re-inforces this link with people engaged in metallurgical activities since magadha was close to the mineral-rich region in Bihar where the people migrated after the desiccation of the River Sarasvati.

Bronze-age invention of weapons and tools

R.gveda is an extraordinary document of the early human civilization during the transition from the chalcolithic (copper and stone) to the bronze (ayas) age. Bronze constituted a revolutionary technological advance since by the process of alloying copper (**ta_mra**) and tin (**trapu**), a hardened metal was evolved which resulted in the production of metallic weapons and tools. This revolutionary invention altered the social organization radically. It should be noted that the R.gveda is not a treatise on war but the core theme is related to the processing of 'soma' through yajn~a (often wrongly translated as 'sacrifice'), using intense fire for days and nights, for example, in agnis.t.oma.

There is a reference to 'pan~ca jana' or 'pan~ca kr.s.t.i' (lit. five furrows) in the R.gveda. This indicates that agricultural practices of the 'five peoples' differentiated the five groups: Anu, Druhyu, Puru (and successors, Bharata), Yadu (Yaks.u),Turvas'a. [In Avestan tradition, the seven groups recognized are called: karevars, a reference again, to the 'working classes', smiths.] Note: The Old Tamil tradition divides the peoples into five artisan classes: otl kammALan2 kamma_l.an smith, mechanic, artisan, of five castes. Also, kan.n.a_l.an means a smith, an artisan.

Dadhikra_ spreads his force over the 'five furrows, or five (working) classes', pan~ca kr.s.t.i_ (RV 4.38.10).

Thus, the lexeme, 'vrata' might have connoted a group of houses lived in by 'vra_tya' or chariot-makers, carpenters and other artisans. The parallel with the nature of the settlements in the Sarasvati Sindhu civilization archaeological settlements is striking and will have to be investigated further in the context of repeated references by archaeologists of many settlements as 'citadels', and 'fortified settlements'. The massive brick-walls which make up the fortifications in many settlements have to be explained in the context also of the nature of the 'forts' built-up during historical periods in the Sindhu-Sarasvati River Basins.

If some of the vra_tya were later termed as asura, there is a clear indication that both vra_tya and yajn~ika were the same people of common descent:

S'Br. 13.8.1.5: "Four-cornered (is the sepulchral mound). Now the deva and asura, both of them sprung from Praja_pati, were contending in the (four) regions. The deva drove out the asura, their rivals and enemies, from the regions, and, being regionless, they were overcome. Wherefore the

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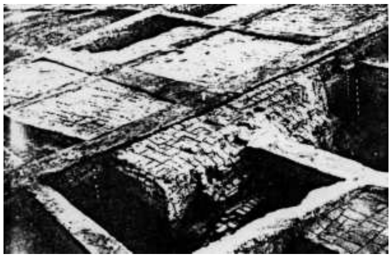
people who are godly make their burial-places four-cornered, while those who are asuric, the easterners *(pra_cya_h)* and others, (make them round, for they (the gods) drove them out of the regions…"

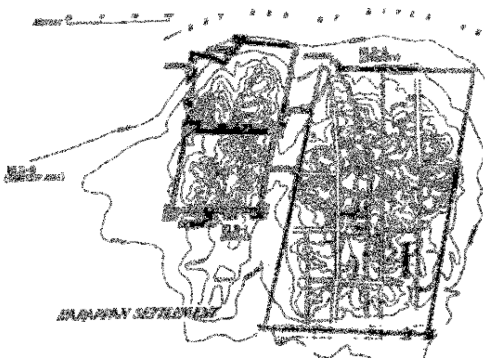
This can be related to archaeologically to post-cremation practices found in Dholavira of circular stone structures containing pots with ashes and bones. Pra_cya_h may refer to people of Magadha region, where circular stu_pa-s with 24 spoked-walls are found as in the stu_pa found at Sanghol, Punjab. These people might have migrated to the BMAC region to set up the man.d.ala-type fire-temple structures.

Sarasvati_ to be a firm, metallic fort (RV 7.96.2: sarasvati_ dharun.ama_yasi_pu_h) Ka_t.haka Upanis.ad (5.1) refers to eka_das'a-dva_ra (pura or citadel of eleven doors) and S'veta_s'vatara Upanis.ad (3.18) refers to nava-dva_ra- pura (citadel of nine doors); on interpretation is that the count of gates is relatable to the body and not to a fort.. S'Br. (11.1.1.2.3) refers to a gate of a city. It is notable that archaeology has revealed fortified settlements with multiple gates in sites along Rivers Sarasvati and Sindhu.



Dholavira: east gate of the castle in the citadel; north gate of the castle in the citadel.

Banawali: streets, residential sectors near the east gate of the lower town, Harappan period (Period II).



Banawali. Fortification wall, mud bricks. Harappa period.

"The bi-partite wall which runs centrally across the mound from north to south, dividing the settlement into two halves, has so far been traced to a length of 105 metres and height of over 4.50 metres. The average thickness of this wall is about 6 metres. It is significant to note that near about the center of this wall is a narrow but impressive opening, possibly serving the function of a postern-gate through which communication could be maintained between the two halves of the walled city. At one stage the gate was made 'pucca' by way of constructing a drain-like structure which was perhaps meant to let out the drain watr also.

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That this gate was not for unrestricted movement of people has been attested by the discovery of a massive square bastion or tower built against the dividing wall at the entrance itself. This little evidence goes a long way to prove that the Harappan social structure was much more regimental than that of the Sothi period.” [After fig. 3 in R.S. Bisht and S. Asthana, Recently excavated Harappan sites, in: Maurizio Taddeo, ed., *South Asian Archaeoogy 1977*, Naples, pp. 227-228].

Kalibangan-I General view showing rampart (defence) walls facing South and West looking North-East. Salient with four to six massive platforms.

Formation of the ra_s.t.ra, ks.atriya and molten metal

The references to Khshathra in Avestan are remarkable parallels to the legacy of the bronze-age civilization of the Sarasvati and Sindhu River Basins where the settlements were substantially dedicated to working with metals. In the context of the keys to decode the inscriptions as bronze-age weapons, it appears that these River Basin settlements were insipient evolution of the ks.atriya, the warrior groups in stabilising the ra_s.t.ra (also referred to the R.gveda (RV 4.42.1; 7.34.11; 84.2; 10.109.3; 124.4). This word denotes 'kingdom' in Atharvaveda and other later texts (AV 10.3.12; 12.1.8; 13.1.35; VS 9.23; 20.8; Taittiri_ya Samhita_ 1.6.10.3; 3.5.7.3; 5.7.4.4; Taittiri_ya Bra_hman.a 1.2.1.13; Maitra_yan.i_ Sam.hita_ 3.3.7; 7.4; 8.6; 4.6.3). The priest, Purohita, is called ra_s.t.ragopa, protector of the realm in Aitareya Bra_hman.a (7.25).

What evolves as ks.atriya dharma or the duties of the royalty finds mention in the context of the sovereign power of Ahura Mazda. Ancestors are called ks.atra and refer to Mitra, Varun.a, Indra and A_ditya-s. Zarathus.t.ra uses the word in the meaning of power, divine power symbolized in the Kingdom of Ahura Mazda. He calls it vohu khshathra, 'the Good Kingdom' (Ys. 31.22; 48.8); or khshathra ishtoish, 'the Kingdom of Desire' (Ys. 51.2); or khshathra vairya, 'the Wished for Kingdom' (Ys. 43.13;51.1). Khshathra is created by Ahura Mazda (Ys. 44.7). In post-Ga_thic texts, Khshathra Vairya is the name of the archangel representing Ahura Mazda's divine majesty.

"Khshathra's sphere over metals. Ahura Mazda has created the earth rich in soil and has filled its bowels with untold mineral wealth and has desired that mankind should thrive and prosper through the riches obtained by their diligence and labour. Wealth is the natural concomitant of all earthly kingdoms... The righteous will reap their final reward and the wicked will eet with their retribution when Ahura Mazda will judge them through the molten metal. (Ys. 51.9)." (p. 58).

Bhr.gu: Fire-priest, chariot-maker, warrior

Bhr.gu and Bha_rgava are fire-priests, also warriors. Atharvan and A_n:giras are likened to two eyes of Bhr.gu: atharva_n.as'ca ho va_ a_n:gi_rasas'ca bhr.gu caks.us.i_ tad brahma_bhivyapas'yastad ya_nanvayam va_ idam sarvam yad bhr.guva_n:girasa iti (Gopatha Br. 1.2.22). They are the founders of 'om' (GBr. 1.1.28). While Bhr.gu and A_ditya-s came out of the flames of the semen of Praja_pati, the A_n:girasa-s came out of the coals and out of the re-kindled 'coals' came Br.haspati. Out of the coal dust other animals were produced (AitBr. 3.34). A variant version occurs in the Maha_bha_rata (Anus'a_sana Parvan 85): One who arose from the flames of fire (Bhr.) was called Bhr.gu; another came out of the burning charcoal (an:ga_ra), he was called An:girasa; the third originated from the extinguished charcoal (an:ga_rasam.s'raya_t) and was called Kavi:

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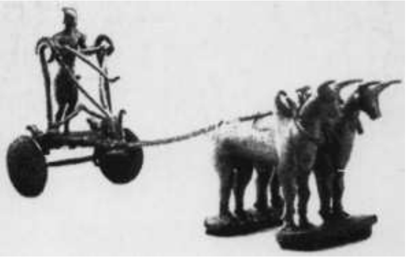
bhr.gityeva bhr.guh pu_rvaman:ga_rebhyo' n:gira_bhavat; an:ga_rasams'raya_ccaiva Kaviriyaparo' bhavat; saha jva_la_bhirutpanno bhr.gustasma_d bhr.guh smr.tah (15-16). So, it that Kavi-s in the Iranian tradition, described as the lineage of the Kayanides, are described as 'smiths'.

Daimabad, 2nd millennium chariot.



"It has a front guard consisting of two vertical curved bars with turned upper ends, whereas the lower ends are attached to a horizontal bar which, in its turn, has two ring loops for the axle. The guard also has two horizontal bars fixed to it. Of these, the upper one is straight while the lower one is angular. The guard is further strengthened by two oblique bars soldered together in a dog standing on the central pole just in front of the guard. The platform on which rises the guard has on its either side a pair of birds formed into one by merging bodies, but having their heads in opposite directions. Stylistically they are related to the terracotta bird whistles from Harappan sites." (Kosambi, 1965) [cf. different views of the Daimabad chariot at: Sali, S.A. 1986. Daimabad 1976-79. New Delhi: Archaeological Survey of India; Fig.10.55 from Allchin, B.and Raymond Allchin, 1982, The rise of civilization in India and Pakistan, Cambridge Univ. Press; Fig. 4.5 from Kosambi, D.D., 1965, *The culture and civilisation of ancient India in historical outline*, London, Routledge and Kegan Paul].

The two birds on the Daimabad chariot model are comparable to the two birds shown on a boat on a Mohenjodaro tablet.

m1429b Tablet. Mohenjodaro. A boat with two birds facing opposite directions.

What was the dog called in the 2nd millennium; and what does it connote? zvan m. (nom. sg. du. pl. {zva_} , {zva_nau} , {zva_nas} ; weakest base {zun} cf. {zuna}; in some comp. {zva_} for {zva} , a dog , hound , cur RV.; ({zunI}) f. a female dog.[Cf. Zd. {spa1} ; Lat. {canis} ; Lit. {szu} ; Goth. {hunds} ; Eng. {hound} ; Germ. {Hund}.] cuva_, cuva_nam = dog (Ta.) Homonym: svani_ka = having a fair or radiant countenance (as Agni)(RV)[svani= fire (Agni)] sva_ni-ratha = sva_nad ratha (having a rattling chariot, RV; cf. Monier Williams) khvaniratha (Av.)(German. schwan; Anglo Sax. swin).sva_n = making sound (RV 1.104.1); sva_nah = sound (RV 5.2.10; also name of one of the guards of the Soma (Taittiri_ya Sam.hita_ 1.2.7.13). sva_ni-ratha = rattling chariot. The terms used in Avestan are: hvanirathem, hvaniratha, khaniratha, which is one of the 7 keshvars (or karshvare: regions, continents) of the earth: Svanadratha is mentioned in the R.gveda (RV 8.1.32): svanadratha = having a rattling chariot (Skt.lex.) It is unclear if this can be related to the lexeme, 'svani', fire in which case: sva_ni-ratha = svanad-ratha or the ratha which carries the 'agni' for the sacrifice. The symbolism of the 'dog' on the pole of the chariot can then be explained as a grapheme corresponding to the lexeme, 's'van'. The name of one of the two gandharvas, namely, sva_n, who guarded the stolen soma is significant. In Yas't 10.67, Mitra is stated to come, driving in a chariot, from the eastern continent Arezahi_ to the splendid continent of Xvaniratha. The last two lines of the verse are rendered by Gershevitch as: “(Mitra comes) equipped with prompt energy, Mazda-created

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fortune, and Ahura-created victoriousness”. (I. Gershevitch, *The Avestan Hymn to Mithra*, Cambridge, 1959). The name of the continent, Xvaniratha, seems concordant with Sva_n, the gandharva who guarded the soma. Sarasvati_ is called ‘ams’umati_’, full of the soma: “…Soma, frightened by Vr.tra, fled to the Ams’umati_, flowing in the Kuruks.etra region. He settled there and gods, too, settled there along with him. They used soma, and thereby evolved Soma-sacrifices.” (Su_ryakanta, Sa_ras, Soma and Si_ra_, *ABORI*, vol. XXXVIII, Poona, 1958, p. 115).

The symbolism of the two birds looking at opposite directions may be compared to similar birds depicted on the picture of a boat on a Mohenjodaro tablet; if these are 'direction' or 'navigation' birds, the same 'meaning' can be assigned to the two birds on the Daimabad chariot. In later, younger Avestan texts, xvaniratha (karshvar hvaniratha) is the name of a continent. The adjective 'luminous' used in Yasna 57.30 is significant, in the context of the interpretation of 'svani' as fire in R.V.

The Manthrans, or chanters are those who are privileged to recite the spells. (Vd. 4.44). The R.gveda r.ca-s are referred to as 'mantra' with specific reference to the occasions on which particular r.ca-s are recited. The Manthrans and Ahuna Vairya spell and the reference to angra are clearly traditions borrowed from the tradition which continued in Bha_rata in prescriptions contained in s'rauta su_tra and bra_hman.a texts.

Similarly, Avestan texts refer to Spenta Mainyu and his adversary Angra Mainyu as **thworeshtar** or the fashioners or cutters. This is a legacy of the Tvas.t.r. of the R.gveda, Tvas.t.r. the carpenter in Atharvaveda (AV 12.3.33) where he uses the axe (svadhiti) to fashion *ru_pam sukr.tam* (from wood) (cf. Pan~cavims'a Bra_hman.a 25.4; La_t.ya_yana S'rauta Su_tra 10.12.12). He is Tas.t.r. in R.gveda again as a carpenter who fashions. (RV 1.61.4; 105.18; 130.4; RV 3.38.1; RV 7.32.20; RV 10.93.12 119.5; cf. Niruktam 5.21).

Va_hika and Madra, both of northern Punjab, are vra_tya. (MB 8.30). Aitareya Bra_hman.a places the lands of northern Kuru and northern Madra beyond the Himavant. (ABr. 8.14). Ba_hika refer to Rudra as Bhava and easterners call him S’arva (S’Br. 1.7.3.8). Vra_tya rode on a *vipatha* chariot which “should be yoked with (two animals:) a horse and a mule”. (s’a_n.d.ilya cited in LS’S 8.6.10: **as’va_s’vatara_bhya_m yuktah sya_t; A_pS’S 22.5.5 = HS’S 17.2.33: as’vo s’vataras’ ca yugyau**). The **vipatha** is **pra_cya-ratha** (the chariot of the easterners: LS’S 8.6.9). This remarkably parallels “the Hittite ritual wherein a vehicle was drawn by paired animals with a mule yoked on the left and a horse on the right side.” (Mallory, J.P., 1981, The ritual treatment of the horse in the Early Kurgan tradition. *Journal of Indo-European Studies*9: 205-226: 216 citing Otten, H., 1958, *Hethitische Totenriuale*, Deutsche Akademie der Wissenschaften zu berlin, Institut fu Orientforschung, Vefoffentlichung 37, Berlin: 138-139). The mleccha-s of Bharat, the vra_tya-s of the R.gveda had influenced the Hittites by going across the Tigris-Euphrates doab, with this remarkable cultural trait! The vra_tya were the *ra_japutra*, the later-day princes and kings of Mitanni! Hittites were vra_tya.
It is likely that, as the inscribed objects get interpreted firmly as conveying lists of bronze-age weapons, arms and armour as property items and as bills of lading prepared by armourers, these parallels between the Vedic culture and the Civilization area will unravel further as armed camps and armouries.

All vedic people were vra_tya, derived from vra_ta, group. Patan~jali notes that vra_tya were part of a republican constitution. (*Maha_bha_s.ya* 5.2.21; cf. ra_janya janapadasa, an epithet, an

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equivalent of the ks.atriya: Cunningham, *Coins of Ancient India*, p. 69; VS Smith, *Catalogue of the Coins in the India Museum*, Vol. I, p. 164). The use of gan.ayajn~a indicates a commune for social organization. A.B. Keith notes: 'That they (Vra_tyas) were non-aryan is not probable for it is expressly said that, though unconsecrated, they spoke the tongue of the consecrated; they were thus apparently aryans.' (*Vedic Index*, II;JRAS, 1913, p. 155; cf. *Religion and Philosophy of the Vedas and Upanishads* (*Harvard Oriental Series*), Vol. XXXI, p. 338).

Vra_tapati means, 'lord of troops' (TS 4.5.4.1; Ka_t.haka Sam.hita_ 18.13; MS 2.9.4; VS 16.25) and is comparable with gan.apati, 'lord of groups'. (cf. *Vedic Index*, II, p. 342). Pan~cavims'a Bra_hman.a (17.1.9: 'they call what is easy of utterance, difficult to utter') expressly states that Vra_tyas spoke the tongue of the consecrated, thus making them Vedic people as much as those who perform yajn~a-s. The su_tra-s refer to their arhants ('saints') and yaudhas ('warriors') comparable to the bra_hman.a and ks.atriya (cf. *Vedic Index*, II, p. 343).

The principal source for the tradition of the vra_tya is *Atharvaveda vra_tyaka_n.d.a* (AV 15). *Brahma_n.d.apura_n.a* (Madhyabha_ga: 63.138 ff. Recounting events related to Sagara's conquest, s'aka, pahalava, yavana, kamboja, parada, ma_hisika, darava, chola, khas'a are stated to have approached Vasis.t.ha) notes that Vas'is.t.ha rescued these people by turning them in vra_tya.
Kaus'i_taki A_ran.yaka (7.13) connects Magadha with the vra_tya (AV 15.2.14). The legend of Pr.thu-Vain.ya (VP 62. 138-139) Su_ta and Ma_gadha are related to the dynasty of Pr.thu, the first monarch. Ma_gadha were the bards and minstrels. Su_ta sustained the king at the eka_ha-sattra (PB 19.1.4) and one of the eleven ratnin at the ra_jasu_ya ceremony. (S'B 5.3.1.5). Su_ta wa a soldier, chariot driver and a healer. Sa_yan.a commenting upon RV 10.34.12 (cited earlier) notes that the terms gan.a and vra_ta may be synonyms, connoting collective life of peoples: gan.a had sena_ni and vra_ta had ra_ja-prathama. *Jaimini_ya Bra_hman.a* (2.26) notes that for the vra_tyastoma of ais.ikapa_va-s, Kaus'i_taki (the author of the Kaus'i_taki Bra_hman.a of the R.gveda) was the gr.hapati. *Ka_tya_yana S'rauta Su_tra* (Ka_s'i edn.: 22.4: cartva_ro vra_tyastoma_ gan.ayajn~a_h) endorses the concordance between vra_ta and gan.a by referring to the vra_tyastoma as gan.ayajn~a and enjoins a gr.hapati for each of the four kinds of vra_tyastoma. Agrawal notes that the leader of vra_tya was perhaps called a gra_man.i_ (VS Agrawal, 1953, *India as known to Pa_n.ini*, p. 440).
The term, 'vrata' occurs in the R.gveda about 220 times and seems to connote (1) deeds or functions of divinities and (2) divine ordinances about conduct or vows to be fulfilled, in community living. Vra_ti means a horde or settlement and a vrata is explained as a roving band. In AV 2.9.1, the term vra_tya is interpreted as equivalent to troops. PB 17.1.5.12 uses the term, prava_sa which may mean a sojourn, thus vra_tya may be those who led the life of a sojourned horde. In RV 1.163.8; 3.26.2; 5.53.11, the troops of the Maruta are referrd to as **s'ardha, vra_ta** and **gan.a**. Yajurveda and Ta_n.d.ya Bra_hman.a refer to Rudra as vra_tapati and gan.apati (VS 30.8; TB 3.4.5.1). Su_tra texts refer to vra_tya as arhanta (saints) or yaudha (warriors). Roth opines that vra_ta may connote a guild (cf. St. Petersburg Dictionary; Pan~cavims'a Bra_hman.a 6.9.25; 17.15.12; VS 16.25; TS 1.8.10.2). Vra_ta_ni is a term which occurs in RV 3.26.6 (cited below) and 5.53.11 and vra_tyabhya_m is a term which occurs in AV 19.23.25. vra_ta is a san:gha living by violence, according to Pa_n.ini (*Ka_s'ika*: 5.3.113: utsetha ji_vinah san:gha_ vra_ta_h). Patan~jali endorses this by stating that vra_ta refers to san:gha. (5.2.21: vra_tena ji_vati ki vra_rtana_ma? na_na_ ja_ti_ya_ aniyatavr.ttaya utsedhaji_vinah san:gha_ vra_tah tes.a_m karma vra_tam, vra_takarman.a_ ji_vati_tivra_ti_nah. Weber notes that vra_ta means a troop and adds:

'Vra_ta (troop), the chief of a band of wanderers of aryan extraction, but absolutely independent, free from fetters of Bra_hmanical hierarchy and not following the aryan way of life'. (Weber,

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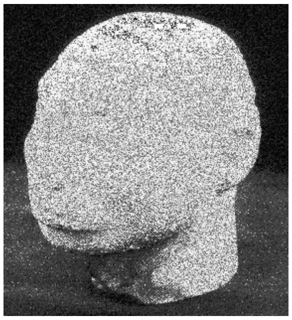
Indische Studien, 1.25.15, 121-40). Vra_ta is defined as san:gha_tmaka in RV 1.163.8; aviviks.itagan.a in RV 5.5.11; samu_ha in Gopatha Bra_hman.a 6.69.51. RV refers to the heroes as as vra_tasa_ha_h (RV 6.75.9; 10.34.12). *Maha_bha_rata* (Anus'a_sana Parva, line 2621) equates vra_tyas with can.d.a_la. The vra_tya ka_n.d.a of Atharva Veda conclusively shows that the Vra_tya was a roving band (brata) or fellowship adored within the Vedic system. Cu_lika_ Upanis.ad (cf. Deussen's Upanis.ads, pp. 637, 640) notes the celebration of Brahman in the form of Vra_tya and mentions vra_tya and brahmaca_rin in the same verse. Cha_ndogya Upanis.ad (5.24.4) endorses that the sacrificial remnant may be offered even to an outcaste provided only that it be done with the right knowledge and it is as good as offering to the omnipresent Parama_tman.

vra_tya a_si_di_yama_na eva sa praja_patim samairayat
1.1.1. Verily the Vra_tya was in a state of motion. He motivated (gave an impulse to) Praja_pati. Notes: In the Pappala_da recension, it is said, 'Vra_tya was in the beginning of all this'.
sa praja_patih suvarn.ma_tma_tmannapas'yat tat pra_janayat
1.1.2. The Praja_pati saw gold in Himself and gave birth to it.
Notes: Just as all kinds of ornaments are made from gold, in the same way the succeeding universe in all its variety is born from this sum-total of Sam.ska_ras (residual effects of action)...Praja_pati is called Hiran.ya-garbha -- He who carries gold in his womb, i.e., within himself.
Veda-s underscore the rise of settlements, integration into a community, of all peoples, *vis'ah* (AV 3.4.2: **tva_m vis'ovr.n.ata_m ra_jya_ya**; AV 3.4.6: *vis'* elect a king). The *vis'*, the people, build the ra_s.t.ra, the nation. The term used by Vis'va_mitra, *bha_ratam janam*, could also be interpreted to mean: *bha_rata ra_s.t.ra*, the nation of Bharat.

A key component of ra_s.t.ra is vrata. Vrata is an integral part of the Vedic cultural tradition, exemplified by the Maha_vrata performed during the *gava_mayana sattra*; the s'astra (for e.g., a_jya prauga) of the Maha_vrata are taken from Vis'vajit, the 'conquering of the regions', an allegory or metaphor related to emerging socio-political organization of communities.

Three standing figurines attest to the sartorial styles of the civilization. The left showsa female wearing necklaces and headdress. The center figurine is a male. Mohenjodaro. (After photo in: http://bosei.cc.u-tokai.ac.jp/~indus/english/2_2_02.html)



Male head probably broken from a seated sculpture. Carved sand-stone head. Mohenjodaro. 13.5 cm. high

Three views of the bronze cast statue with exquisite hair-knot tied into a bun at the back and wearing a three-beaded pendant, bracelets from wrist to shoulder on one hand and on the wrist and elbow on the right hand [Marshall, MIC, Pl. XCIV, 6 to 8]. This is distinctly different from the bearded figures

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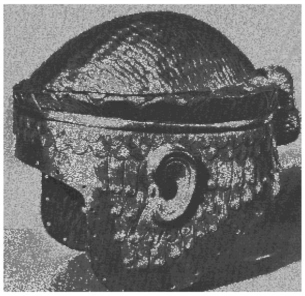
shown wearing shawls, with fillets on their foreheads, clean-shaven beards, almost all bald-headed and some wearing a long pig-tail flowing down at the back. Priests: statuary [Marshall, MIC, Pl. XCVIII; four views 1 to 4; Pl. C, 1 to 6].

There are statuary showing bearded persons with hair-knots tied into a bun at the back. [Marshall, MIC, Pl. XCIX, 4 to 9].

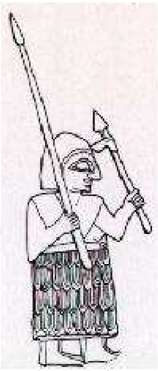
The depiction of a clean-shaven face is notable, pointing to the use of a metal razor for shaving. Such a razor should have included ferrous ores alloys, such **aduru** 'native metal' (Ka.).

Mohenjo-daro. Terracotta figurine. Hair-do (turban?). [After Marshall, MIC, Pl. XCV, 30]. Perhaps this may represent ka_kapaks.a described of S'ri Ra_ma in the Ra_ma_yan.a by Va_lmi_ki.



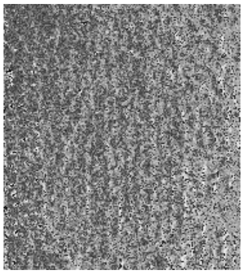
Yogin sculpture. Mohenjodaro. Right-shoulder bare: por-kai (Ta.)

The electrum-gold helmet of a warrior found in the Royal Tombs of Ur also depicts a similar bun at the back of the head.



Maris Mesopotamia. Warrior carrying a battle-axe on his right hand a curved sword or adze on his left and a dagger or knife tucked in his belt.

A toy bed at Harappa bore this textile impression showing a piece of tightly woven cloth using uniformly spun thread. (After Harappa Archaeological Research Project/Courtesy Dept. of Archaeology and Museums, Govt. of Pakistan).The find relates to the Harappan Phase (c. 2600-1900 BCE). This example shows a fairly tightly woven normal weave. . [After slide 115 from the Harappa excavations after 1996.] Cotton, *Gossypium arboreum*, was found at Mohenjodaro. Fibres of cotton were discovered adhering to a silver vase at Mohenjo-Daro (Turner and Gulati, 1928), and several faiences and vessels from Mohenjo-Daro and Harappa had impressions of woven fabric made of finely spun thread (Marshall, 1931).



Maha_vrata

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According to *Baudha_yana*, Maha_vrata was a practice ‘in olden times.’ The Maha_vrata was a feast offered by vra_tya. (Hauer, J.W., 1927, *Der Vra_tya*, I. Stuttgart; Rolland, Pierre, 1973, Le Maha_vrata, *Nachricten der Akademie der Wissenschaften in Gottingen, Philologisch-historische Klasse*, Jg. 1973: 51-79). Jaimini_ya Bra_hman.a (2.405) note that at the end of the Maha_vrata: “they make a *ma_gadha* and a *pums’calu_* copulate on the southern border of the *vedi*.” The event involved scolding bouts between a brahmaca_rin (celibate student) and a harlot who accuses him because he has broken his vrata (vow) of chastity and in turn, the student chastised the woman as ‘a vile harlot, the washerwoman of the warring band, who cleanses the member of every man.’ [LS’S 4.3.11: **dhik tva_ ja_lmi pums’cali gra_masya ma_rjani purus.asya purus.asya s’is’napran.ejani_ti brahmaca_ri_**]. These exchanges or verbal duels are comparable to a_hanasya_ verses (AV 20.136; a_-han ‘to strike, to smite’); The *ma_rjani_*, the washerwoman is the *d.ombi_*. Young da_si_, maidens, carry waterpots, smite their thighs, sing a song of fertility for the cows and dance around the **ma_rja_li_ya dhis.n.ya.** Hundred-stringed harps, flutes and big earth-drums are played for music. The earth-drum was a hole dug in the earth and covered with a bull hide. It was beaten with a bull’s tail (a pun on the word: **s’is’na**); it was called as the divinity **Va_c** (LS’S 3.11.3). **Va_c** is the highest principle, the divinity of war. (RV 10.125.6). The metaphor of purification of soma using the *pavitram*, the earth-drum covered with a bull hide is complete. Kurus went on a vra_tya expedition to Pa_n~ca_la. (There is only two references to Kurus in R.gveda: a Kuru-s’ravan.a Tra_sadasyava in RV: 10.32.9; 10.33.4; a Pa_kastha_man Kauraya_n.a in RV 8.3.21). It was a Maha_vrata related to the “brahmanical ritual..not one of antithesis but of precedence in development.” (Heesterman, J.C., 1962, Vra_tya and sacrifice, *Indo-Iraniqan Journal* 6.1: 1-37: 36). The as’vamedha horse is accompanied by singing bards called ka_ri-ma_gadha_h and by ra_janya riding vipatha chariots. Jaimini_ya Bra_hman.a (2.222) notes that the **vra_tya** are to speak ‘what is obscene’.

In S'atapatha Br. a **ra_janya** (elsewhere also referred to as a **vra_tya**) is called ks.atra, 'authority or power' (S'Br. 12.7.3.12). Ra_janya is a ra_jan and refers to the kinsmen of a chief. A ks.atra is produced out of the peasantry or a bra_hman.a. (vis'o hi ks.atram ja_yate: S'Br. 12.7.3.8; S'Br. 11.7.3.12). The term, ks.atra occurs in R.gveda and later texts. (RV 1.24.11; 136,1.3; 4.17.1; 5.62.6; AV 3.5.2; 5.18.4; ks.atra-s'ri_ RV 1.25.5; 6.26.8; ks.atra-bhr.t, bringers of lordship': TS 2.4.7.1; TBr. 2.4.6.12; 7.6.3; VS 27.7). IN RV 1.157.2; RV 8.35.17, ks.atra refers to a specific ruler; in other contexts, the term refers to rulers in plural: AV 4.22.2; VS 10.17; TBr. 2.7.6.3. '**..but in no case does it in the R.gveda certainly (See Roth, St. Petersburg Dictionary and Varn.a) mean what it regularly denotes in the later Sam.hita_s (AV 2.15.4; 9.7.9; 12.5.8; 15.10.5; TS 1.6.1.2; 2.2.11.2; VS 5.27; 14.24; 18.38), the ruling class as opposed to the priests (Brahman), the subject people (Vis', Vais'ya), and the servile class (s'u_dra)**...A Ks.atra-pati is several times mentioned as an equivalent of 'king' (TS 1.8.14.2; VS 10.17; TBr. 1.7.8.3; S'Br. 5.4.2.2)." (AA Macdonell and AB Keith, 1912, repr. 1958, *Vedic Index*, Vol. I, Delhi, Motilal Banarsidass, p. 202). The word, 'ks.attr.' is ued in the R.gveda (RV 6.13.2) in reference to god as the 'distributor' of good things to his worshippers. A ks.attr. is associated with Savita_ who produced objects daily for distribution in the vidatha* (house). (RV 7.40.1). In VS 16.26; TBr. 3.4.7.1, the word may refer to a 'charioteer'. It is notable that in the Avestan tradition, khshathra is associated with the prospecting of and smelting of metals, a function akin to the work of a chariot-maker or rathaka_ra. Bow is an attribute of a ks.atriya (AV 18.2.60; Ka_t.haka Samhita_ 18.9; 37.1; S'Br. 5.3.5.30; TA_r. 6.1.3; in ABr. 7.19, the attributes include: chariot, breastplate (kavaca), bow and arrow (is.u-dhanvan). A ra_janya is required to be an archer a good chariot fighter: TS 7.5.18.1; MS 3.12.6; KS As'vamedha 5.14; VS 22.2).

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Maha_vrata is a significant vrata in the series of yajn~a mentioned in the R.gveda. It is postulated that this vrata is relatable to the vra_tya tradition of Bha_rata. Maha_vrata or vikr.ti occurs on vis.uvat (makarasam.kraman.a or winter solstice); karkasam.kraman.a or summer solstice (vis.uvat) was prakr.ti. TMB (4.10.3) recounts how vis.uvat was transferred to the maha_vrata day. Keith notes that the festival of swing and Kr.s.n.a worship (Ma_gha s'ukla 14) are remnants of the Maha_vrata, a celebration of the sam.vatsara (year) equating garutman with the sun. (RV 7.87.5 describes the sun as a golden swing).

There is a lexeme in Santali which may be concordant with Vedic 'vrata' indicating the indigenous evolution of the tradition of vrata as a code of conduct and as a vow to be observed. rada = a row, a line, a course, as of bricks on wall; radha corok = a contrivance by means of which Hindu devotees, and at times also Santals, swing as a religious observance (Santali.lex.)

Maha_vrata is the last day but one of the Gava_mayana Sattra which represented the whole year. The middle day was the vis.uvat or summer solstice and the last day but one was the Maha_vrata or the winter solstice. The rites are related to the increase of the sun's heat after the solstice. [gava_ can be interpreted as 'earth' and hence, gava_mayana connotes the reference to the winter solstice which records the apparent shift, in relation to the earth, in the motion of the sun.]

Some typical activities on this ancient festival day were: warriors fully armed would pierce with arrows the stretched skin of a barren cow. On a rough hide, an a_rya and a s'u_dra wrestle. The Ma_rjali_ya fire is lit and maidens carrying jugs of water on their heads encircle the fire. Maithuna is an attempt to produce fertility as a form of sympathetic magic. Music by drumming is played accompanied by obscene language to drive away the demons.

Maha_vrata is a remarkable example of the continuity of the civilization and culture on the banks of the Sarasvati_. Maha_vrata is the day of the winter solstice which is celebrated as the New Year's Day in Punjab, Assam and Tamil Nadu (cf. Festivals of Rohri, Bogali Bihu, Bhogi-Pongal; the tradition is to burn out the old and herald the new by using the fresh produce from the harvest.) Aitareya a_ran.yaka is an integral component of the Rigveda. The a_ran.yaka has three books: (1) the first book explains the maha_vrata as a ritual and as an allegory and described the 'sastras of the morning, midday and evening libations of the maha_vrata day of the gava_mayana; (2) the second book explains the allegory of the uktha, which is the nis.kevalya s'astra (midday s'astra as the pra_n.a or purus.a); the second book also has the superb upanis.ad (adhy_ayas 4-6); (3) the third book discusses the mystic meaning of the various forms of the text of the sam.hita_, the nirbhuja, pratr.n.n.a and ubhayamantaren.a, and of the vowels, semi-vowels and consonants. These terms are used to described the sam.hita_, pada and krama pa_t.has of the sam.hita_. The fourth book has maha_na_mni_ verses to be studied in the forest. The fifth book has the nis.kevalya s'astra of the midday libation of the maha_vrata. The fifth book is attributed to S'aunaka (ca. 500 B.C.) who is anterior to Pa_n.ini by about 100 years. (A.B.Keith, 1909, *Aitareya A_ran.yaka*, Oxford, Clarendon Press).

"Now begins the Maha_vrata rite. Indra having slain Vr.tra became great. When he became great, then there came into being the Maha_vrata." (Sa_yan.a explains the term mah_vrata: maha_n bhavaty anena vratena or mahato devasya vratam or mahac ca tad vratam. (Aitareya A_ran.yaka I.1) "In the Maha_vrata ceremony there are twenty-five verses to accompany the kindling of the fire." (Aitareya A_ran.yaka: V.1)

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Maha_vrata is an agnis.t.oma and has the morning, midday and evening pressings of the Soma.. The fire-altar is in the shape of a bird. The activity of the Hotr. in the Maha_vrata rite is recorded only in the Aitareya A_ran.yaka and the S'a_n:kha_yana A_ran.yaka. The activity is shrouded in total secrecy. "The Adhvaryu brings up the vessel containing the libation and the (three) atigra_hya bowls. As soon as he perceives the food, the Hotr. Descends from the swing towards the east. Then they tie up the swing to the west that it may not slay the reciter when about to eat. For the Hotr. eats seated on the place of the swing. Then the Hotr. consumes the (libation in the) vessel with the words uttered in response, 'May speech, the deity, rejoice in the Soma,' 'May Soma, the king, shower life on me for my breath,' 'May my breath milk mightily all life… At the proper time they should carry the swing to the bath, and burn together the seats.' " (Aitareya A_ran.yaka : V.3,2) As it is completed, the vedi and the br.si_s are both consumed by fire.

Vra_tyastoma

Vra_tyastoma is described in *Ta_n.d.ya Maha_ Bra_hman.a* and elaborated to in *Pan~cavims'a Bra_hman.a* [PB 17.1.9: 'They differed from Tr.tsu-Bharata-s in not being Bra_hmanical in culture and in differing in speech (adurukta)'. PB 17.4.3 notes that Kaus'i_taka, son of S'amasravah, was a Gr.hapati of the Vra_tya. Sa_yan.a notes that Kaus'i_taka was the r.s.i of a s'a_kha of R.gveda]. PB 24.18 refers to sixty-one day rites and cites one Buddha Sauna_yana as the stha_pati of Daiva Vra_tya. Stha_pati may refer to a yajama_na (gr.hapati), a chief or king. Gr.hapati-s may be leaders of many vra_tya groups. PB 17.1.17 states that each vra_tya brought to the leader thirty three cows since they were allowed to prosper by their leader. Ukthya in agnis.t.oma may refer to uktha, land or cattle. Thus, using cattle, the leader leads the vra_tya to prosperity. The ceremony of gava_mayana sattra included the Maha_vrata on the last but one day, a day called udayani_ya (*Yajurveda*: TS 7.5.9.10; KS 34.S; *Ta_n.d.ya Bra_hman.a* 1.2.6; *Ta_n.d.ya Maha_ Bra_hman.a* 5.5.6; *Taittiri_ya A_ran.yaka, Kaus.i_taki_ and S'a_nkha_yana A_ran.yaka 1.5; 1.2*). The Maha_vrata is performed as an eka_ha or as ahi_na (performed on the tenth day of the Pun.d.ari_ka). A beast is sacrificed to Indra and Agni analogous to agnis.t.oma. A pot- full of Soma is dedicated to Praja_pati accompanied by recitation of Maha_vrata Sa_man; a beast is offered with the recitation of Mahaduktha. *Aitareya A_ran.yaka* (indro vai vr.tram hatva_ maha_nabhavat tadyayan maha_nabhavat tanmaha_vratasya maha_vratatvam: 1.2) extols the greatness of Indra as the cause for Maha_vrata. Maha_vrata sa_man (Pr.s.t.ha stotra accompanied by a lute with thousand strings made of mun~ja grass) and Mahaduktha (Nis.kaivalya S'astra) are symbolised as a bird (eagle or Suparn.a Garutman) with outstretched wings. *S'atapatha Bra_hman.a* refers to such an altar or vedi (S'B 9.1.2.35). Sa_yan.a offers a number of interpretations for maha_vrata: maha_n bhavati anena (he becomes great by means of this), mahato devasya vratam (ritual to propitiate the great God), mahat ca tad vratam (the great ritual) (TB 1.2.6.1; Ab 3.21.1; S'B 10.4.1.4).
Vra_tyastoma was perhaps a procedure to absorb new groups into the commune. The vra_tya wore nis.ka, silver ornament, around the neck (PB 17.1.14).

Vra_tya and Yajn~ika heritage

Atharvaveda (15.1.1: **vra_tya a_sa_ndi_yama_na eva sa praja_pati samairavat**) notes the vra_tya as benefactors of human society or as one who does good to a large number of people. AV (15.10, 11) adds: 'So let the king, to whose house the Vra_tya (Pravrajaka), who possesses the knowledge (of Cosmic Order), comes as a guest, honour him as superior to himself. *So he doth not act against the interests of his princely rank or his kingdom*...Thence arose sanctity.' AV 15.12

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enjoins that without the permission of the vra_tya, the bra_hman.a should not sacrifice. (cf. J.C. Heesterman, Vratya and sacrifice, *Indo-Iranian Journal*, 6 (1962), pp. 1-37).
Juxtaposed to the atharva veda (15-11) which notes that anyone who entertains a vra_tya will gain the road that gods travels, the later-day tradition uses the term, vra_tya to connote specific vocations within the tradition of a_gamas.

Taittiri_ya Samhita contains the followintg text which equates the vra_tya with bra_hman.a and ks.attriya:

“He (the Vra_tya) became filled with passions, thence sprang the Ra_janya.
“Let the king to whose house the vra_tya who knows this, comes as a guest, cause him to be respected as superior to himself. So doing he does no injury to his royal rank, or to his realm. From him arose the Brahman (Bra_hman.a) and the ks.attra (Ks.atriya). They said, ‘Into whom shall we enter…’

Thus, the highest Brahman is conceived and exalted as the Vra_tya. The earthly Vra_tyas were roaming about in rough wagons covered with boards in a war-like fashion, owners of cattle, and perhaps the earliest worshippers of Rudra-S’iva. In the opinion of J.W. Haver, vra_tya were the ecstatics of the ks.atriya and the fore-runners of the later-day Yogin-s. They were clearly ascetics in the early evolution of Hindu Dharma. (cf. Basham, p. 243). They were observers of vrata-s (vows and austerities) and could be re-admitted to perform yajn~a-s after performing vratyastoma. One of the groups of vra_tya was known as Arhanta. Some were worshippers of Lin:ga. Atharvaveda offers a prayer to Eka-vra_tya Rudra. Austerities combined with vows and non-violence resulted in a social structure founded on co-operative activities among the pan~ca-jana, the five peoples, i.e. all the peoples of the land of Bharat. Another group of people who moved from place to place were vr.s’ala. The interactions among the yajn~ika, vra_tya and vr.s’ala resulted in the emergence of the mosaic of Bharatiya culture. The historical traditions exemplified by Mahavira and the Buddha (also known as vr.s’alaka) and the tradition of the ascetics -- ‘*muni*’ and ‘*arhat*’ (words also mentioned in the Kesi-su_kta of the R.gveda), attest to the diverse ways of people in understanding the *r.ta*, the cosmic rhythm.
That the Vra_tya-s were part of the pan~cajana (five peoples) is apparent from the following catalogue of people from various regions of Bharat, mentioned by Manu:
“20. Those (sons) whom the twice-born beget on wives of equal caste, but who, not fulfilling their sacred duties, are excluded from the Savitri, one must designate by the appellation Vra_tyas.
“21. But from a Vra_tya (of the) Brahman.a spring the wicked Bhriggakantaka, the Avantya, the Va_tadha_na, the Pus.padha and the Saikha.
“22. From a Vra_tya (of the) Ks.atriya, the Jhalla, the Malla, the Likkhive, the Nat.a, the Karan.a, the Khasa, and the Dravid.a.
“23. From a Vra_tya (of the) Vais’ya are born a Sudhanvan, An Akarya, a Karus.a, a Vijanman, a Maitra, and a Sattvata.” (Manu, 10.20-23).
In reference to the mention of dravid.a as vra_tya, cf. A.P.Karmarkar, 1950, *The Religions of India*. Volume I: The Vratya or Dravidian Systems. Lonavla.
The names of groups of people mentioned by Manu could be related to the gan.a-s or janapada-s of vra_tyas such as Licchavi, Malla, Moriya and among the Na_ga in Taks.as’ila, Pa_ta_l.apuri, Udayanapuri, An:ga and Champa. The vra_tya of the east and north-west of Madhyades’a may be identified as the speakers of Prakrit. In Mahawanso, there is a narration about the son of a courtesan from a Licchavi king who was thrown on a dust-heap, later rescued by a Na_ga king and made to ascend the throne of Magadha. (Ferguson, p. 63). After the S’is’u-na_ga kings, the Nanda dynasty

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ruled Magadha; one of the founders was known as Vra_tya-Nandi S'is'u-na_ga. The name denotes that the na_ga were vra_tya and that the Nanda were also of Na_ga lineage. (Kosare H. L. *prachin bharatatil naag*, marathi, 1989, Dnyan Pradip prakashan, Nagpur, p.43.)

Another view of scholars related to the social structure of Bha_rata in the historical periods just prior to the advent of Maha_vi_ra and Gautama Buddha explain vra_tya-s as non-Aryans absorbed into the 'Aryan' society: "The Sama Veda spoke at length of the Vratyastoma (a particular sacrifice or ritual) by which non-Aryan Vratyas were admitted into Aryan society. The equalization of castes and communities was, of course, brought to a head by Gautama Buddha, though he was no opponent of the Brahminical civilisation. Both he and Mahavira, the expounder of Jainism, while admitting that the Brahmin ideal is the right one, led a crusade against certain aspects of Brahmin culture. Hindu civilisation itself adapted for its use many ideals and precepts of Buddhism and Jainism. For instance, among many communities, offerings of rice and ghee took the place of animal sacrifice - a compromise with the Vedic ritualism." Source: *The Gazetteer of India*, Volume 1: Country and people. Delhi, Publications Division, Government of India, 1965. CHAPTER Vlll - Religion HINDUISM; Section: Cultural Synthesis by Dr. C.P.Ramaswami Aiyar, Dr. Nalinaksha Dutt,Prof. A.R.Wadia, Prof. M.Mujeeb,Dr.Dharm Pal and Fr. Jerome D'Souza, S.J.

Bharata, was a great Paurava king. (Va_yu 99, 137-40; Matsya 49, 14-15; Hv 32, 1726-7; BR 13,58; Agni 277, 7-8; MBh 1,94,3710-12; loc.cit. Pargiter, p. 159). Bharata made an offering to the Maruts; they gave him Br.haspati's son Bharadva_ja as an adopted son. Bharadva_ja thus became a ks.atriya; Bharadva_ja's son Vitatha (Vidathin?) was consecrated as Bharata's successor. (Matsya 49, 27-34; Va_Yu 99, 152-8; Hv 32, 1727-31; Br 13, 59-61; loc.cit. Pargiter, p. 159). Sa_yan.a notes that Vis'va_mitra was a descendant of Bharata, in his commentary on r.cas RV 3.53.13, 24. There are two renowned Bharatas who are mentioned in the R.gveda: Suda_sa and Divoda_sa. Both are noted as descendants of Bharata in RV 3.53. 9,11,12,24 and RV 6.16.19; the su_kta RV 3.53 is by Vis'va_mitra Ga_thina.

Magadha, su_ta; kavi, karapan

Avestan texts refer to Kavi Usan (or Us'ana_), Kavi Kava_ta (later identified with Kaikoba_d) and Kavi Usadhan (later identified with Kaikaus). In the tradition of Zarathushtra, the Kavis are condemned perhaps as a group who had joined the enemies. Perhaps, there is an intimation of the increasing animosity between the kavis who are smiths (who later become chieftains) and kavis who are priests. Zarathushtra refers to the Us'ij (Aus'ija) identifying them with Karapan (Y 44.20), a term used for enemy priests. He also refers to grahma as the persistent enemies (Y 32.12-14). It is unclear if this is concordant with gra_ma in RV 3.33.11 (which refers to the troops of Bharata).

Br.haspati is a form of Agni and both are Kavis: RV 2.23.1: kavim kavi_na_m upamas'ravastamam jyes.t.hara_jam brahman.a_m brahman.aspate... Maruts are called kavi in RV 1.87.5 and also as r.kvan, elsewhere. Soma is called Kavi; he has attributes like kavi_yat, kavikratu, kratuvid, vipra, vis'vavid connoting a similar idea. RV 9.6.8: a_tma yajn~asya ranhya_ sus.va_n.ah pavate sutah pratnam ni pa_ti ka_vyam; RV 9.87.3: r.s.ir viprah puraeta_ jana_na_m r.bhur dhi_ra us'ana_ ka_vyena sa cid viveda nihitam yad a_sa_m api_cyam guhyam na_ma gona_m, 'A father of the gods, their strong begetter...a R.s.i, a wise one, a leader of men, a steadfast R.bhu, an Us'anas in wisdom, he found what was hidden of that, the concealed secret name of the cows'...RV 9.96.18: r.simana_ ya r.sikr.t svars.a_h sahasran.i_thah padavi_h kavi_na_m, 'He who has the mind of the R.sis, creates the R.s.is, recovers the light, knows thousand wise men and is the forerunner among

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the Kavis...RV 9.85.9 adhi dya_m astha_d vr.s.abho vicaks.an.ah aru_rucad vi divo rocana_ kavih ra_ja_ pavitram aty eti roruvat divah pi_yu_s.am duhate nr.caks.asah, 'The all-knowing bull ascended to heaven. The Kavi caused the spaces of heaven to shine. The king passes through the Pavitra with a roar. They milk the juice of heaven which beholds the mankind.' [Alfred Hillebrandt, 1927, Vedische Mythologie, tr. Sreeramula Rajeswara Sarma, 1980, Vedic Mythology, 2 vols. Delhi, Motilal Banarsidass, vol. I, p. 246, p. 224]

The tradition of magadha-s and su_ta-s in Bha_rata finds its parallel in the Avestan tradition of kavi-s and karapans -- the smiths (or bards) and the priests. The kavi or the smith becomes the political leader as exemplified by the Kayanians (or Kayanides) of the Avestan tradition. kavi = name. of several gods ,(esp.) of Agni RV. ii , 23 , 1 ; x , 5 , 4 , 3 ; iii , 5 , 1 ; i , 31 , 2 ; 76 , 5 ; of Varun2a, Indra, the As'vins, Maruts, A1dityas ; of the Soma ; of the Soma priest and other sacrificers (Skt.lex.) kaveh = smith (Persian); kovae (Slovenian); kovac (Croatian); kovacsol (Hungarian) = smith.

Kavi Us'anas, les kavis et les karpans -- the kavis and the karapans, the singers and the smiths
In the Vedic tradition, Kavi Us'anas is a r.s.i (RV 4.26.1); a variant name is: Us'anas Ka_vya who is also a r.s.i or seer. (RV 1.51.10; 83.5; 121,12; 4.16.2; 6.20.11; 8.23.17; 9.87.3; 97.7; 10.40.7; probably also 1.130.9; 5.31.8; 34.2; 8.7.26; 10.22.6; AV 4.29.6). He is often associated with Kutsa and Indra. He is a Purohita of the Asuras. (Taittiri_ya Samhita_ 2.5.8.5; Pan~cavims'a Bra_hman.a 7.5.20; S'a_n:kha_yana S'rauta Su_tra 14.27.1). Kavi Us'anas is a teacher. (Pan~cavims'a Br. 14.12.5; Jaimini_ya Upanis.ad Br. 2.7.2.6).Us'ana_, the son of Kavi is renowned for making Agni and as the ministrant priest and offerer of the yajn~a for Manu (RV 8.23.17). He is referred to as a r.s.i and as a leader of the people. His poetic gift enabled him to discover the secret milk of cows of Indra which was concealed (RV 9.87.3). He fashioned the thunderbolt for Indra for slaying Vr.tra (RV 1.121.12; 5.34.2). He drove the celestial cows when Atharvan, the institutor of the yajn~a prepared the path for the sun (RV 1.83.5). Soma is compared to Us'anas in his wisdom (RV 9.97.7). Deva-s entreated Us'anas to come to their side and away from the Asuras by using aus'ana sa_mans (wish cows) (PBr. 7.5.20; TS 2.5.8.5). Us'anas Ka_vya desired to obtain vast dominion and he saw Aus'anas Sa_man by practising austerities. (PBr. 14.12.5; J.Up.Br. 2.7.2-6). Us'ana_ is also referred to as a name of a plant from which soma was prepared. He is referred to as S'ukra_ca_rya and as the author of S'ukrani_ti, a school of politics. These attributes link Kavi Us'anas with the Avestan Kavis who are smiths who become kings and who are also seers (kavi and karapan-- seers and priests). S'ukra, preceptor of the asura-s had another name, Ka_vya; ka_vya meant, 'the son of Kavi'. S'ukra's mother is referred to as 'ka_vyama_ta_'. S'ukra is one of the seven sons born to Bhr.gu and Puloma_; possibly, 'kavi' was another name of Bhr.gu, just as 'us'anas' was another name for S'ukra. (Vettam Mani, 1975, *Pura_n.ic Encyclopaedia*, p. 760). Bha_rgava is a descendant of Bhr.gu (S'Br. 4.1.5.1; AitBr. 8.21); Cyavana is a Bha_rgava (Kaus.i_taki Br. 22.4); Gr.tsamada is also a Bhr.gu (TS 1.8.18.1; S'A_r. 7.15; AitBr. 8.2.1.5; Pras'na Up. 1.1; Pan~cavim.s'a Br. 12.2.23; 9.29.39). Gr.tsamada is the r.s.i who sings the praise of Sarasvati_: ambitame, nadi_tame, devitame Sarasvati_...

The break-out of the kavi's from India into Iran can be explained as an ongoing search for minerals -- tin, copper, gold, silver -- in an evolving bronze age.

It is notable that two r.cas (RV 1.51.10 and RV 4.16.2) make a reference to 'us'anas' in the context of prayer to Indra; and in r.ca RV 1.51.10, the reference is emphatially related to a 'taks.a' which is explained as 'sharpening', a clear metallurgical or 'smithy' term. In two r.cas RV 10.49.3 and

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10.99.9, the refernce to Kavi is in the context of 'weapons' and the slaying of S'us.n.a. The other r.cas refer to Us'ana_ (or Kavi or son of Kavi) and Kutsa and in the context of the legend of S'us.n.a. {s'us.n.a = fire (Skt.lex); cun.n.am = lime, oxide of calcium}

Ka_vya Us'anas and Kayanides

"The most exhaustive study ... by Arthur Christensen in his book on the Kayanian dynasty of Iran (Christensen, A.,1932, Les Kayanides. Det Kgl. Danske Videnskabernes Sellskab, Hist.-Filos. Meddelelser XIX.2. Copenhagen). In it he argued that the rulers who are styled Kauui in the Avesta (Kauui Kauua_ta, etc.) were most probably historical figures...the list of Kauuis also contains at least one figure that is also found in Indian tradition, as shown by Lommel and Dumezil, namely Kauuui Usan/Usad.an, who both by name and by the legends associated with him corresponds to Ka_vya Us'anas of Indian tradition. There is therefore every reason to conclude that the list of Kauuis also contains only mythological figures (Kellens, J., 1979, L'Avesta Comme source historique: La liste des Kayanides. In Studies in the Sources on the History of Pre-Islamic Central Asia, ed. by J. Harmatta, 41-53. Budapest, Akademiai Kiado). As for the title kauui itself, although in the later Zoroastrian tradition it designates political rulers, there is no evidence in the Avesta that it is used other than as a designation of a special kind of priest. In the Gathas it is closely related to terms such as karapan and usij, both designate special kinds of priests, and its Indian relative kavi has nothing to do with political power, but designates the poest priest. The kauuis listed in the yashts are also not described as rulers, for which Avestan has a series of very specific terms consisting of a word for territory plus paiti 'lord'. When kauui is not used as a title it is commonly found in lists of opponents of the Zoroastrian religion, a notion inherited from the Gathas, where the kauuis are portrayed as opponents of Zarathustra, with the exception of Kauui Vis.ta_spa, who supported himOn the banks of the River Sarasvati which nurtured the people who have given the world, the R.gveda, also flourished the most extensive civilization of its time, ca. 5500 Before Present (BP). The expansive nature of contacts (mostly for trade) of the civilization is stunning, extending from Ropar on the east to Mesopotamia on the Tigris-Euphrates doab. This long-distance trade and contact was facilitated by the riverine and maritime transport systems on the Rivers Sarasvati and Sindhu and across the Gulf of Kutch and the Persian Gulf." (P. Oktor Skjaervo, 1995, The Avesta as source for the early history of the Iranians, in: George Erdosy, ed., *The Indo-Aryans of Ancient South Asia*, Berlin, Walter de Gruyter and Co.)

Us'anas-S'ukra (Va_yu P. 97.140) and Cyavana [MBh 13.51,2685; also, his descendant R.ci_ka --(Va_yu P. 9193; Pad. P. 6.268,13) ; his grandson Ra_ma_ Ja_madagnya--(MBh 7.70,2435)] are Bha_rgava or Bhr.gu.

This civilization with urbanized use of burnt-bricks, organized streets, water-reservoirs and other water-management systems, street-drains, well-regulated system of weights and measures, workers' platforms perhaps used for metal-, shell-, and lapidary-crafts, was also exemplified by the transition to bronze-age with many inscriptions presented on copper plates and on copper/bronze weapons. Many urban archaeological centres such as Lothal, Dholavira, Surkotada, Kalibangan, Banawali, Kunal, Ropar on this River Basin were fortified settlements (often referred to by archaeologists as 'citadels' and 'lower towns'). The inscriptions are composed of normalized heiroglyphs and ligatured pictographs presented as 'signs' and pictorial motifs which often present ligatured animal bodies. The average number of 'signs' on inscribed objects was five and it is likely that the inscriptions conveyed arms and armour either possessed by warriors or produced by armourers for trade-- as veritable bills of lading. The artefacts unearthed by archaeology provide evidence of the evolution

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and continuity of the cultural traditions of Bha_rata on the Sarasvati-Sindhu River Basins. There is nothing among the artefacts which is not Vedic. On the other hand, there is nothing in the Vedic texts which do not find parallels in the archaeological discoveries -- e.g. references to maritime and riverine trade traditions and to well-developed cities abound in the R.gveda, echoing the archaeological finds of urban centres and trade contacts between the Sarasvati-Sindhu civilization and Mesopotamian CIvilization.

The crossing of a river (sindhu) in RV 7.33.3 is a reference to the crossing of the river Beas (a tributary of the Sindhu) after the battle on the Yamuna with Bheda. As in many other r.cas, the word, 'sindhu' may simply refer to a 'stream'. It is notable that NO archaeological sites have been found on the right bank of the River Parus.n.i**. The archaeological site of Harappa is on the left bank of River Parus.n.i (River Ravi).** The r.ca RV 7.33.3 does NOT say that the direction of crossing of the river Sindhu was from west to east [or north to south]. It will only be a conjecture to deduce that the crossing was from eastern Iran. Just because Vasis.t.ha's descendants claim to be An:giras (RV 7.42.1 and 7.52.3), there is no basis for a conjecture about the locale of An:giras being eastern Iran. S'Br (12.6.1.41) notes that Vas'is.t.has are th priests of Tr.tsu-Bharatas. Ludwig considers that the Tr.tsus and Bharatas are one and the same clan. (Ludwig, III, p. 185; Buddha, 1st ed., p. 413). Oldenberg (ZDMG, XLII, p. 207) notes that Tr.tsu may be identical with the Vasis.t.has who are the priests of the Bharatas. Sa_yan.a interprets the r.ca 7.33.6 equating Tr.tsu with the Bharata.

A_rjiki_ya may be another name for Vipa_s'a (Beas):

RV 075.05 Accept this my praise, Gan:ga_, Yamuna_, Sarasvati_, S'utudri, Parus.n.i, Marudvr.dha with Asikni_, and Vitazsta_; listen, A_rjiki_ya with Sus.oma_. [Gan:ga_...: cf. Roth's Lit. and Hist. of the Veda, pp. 136-140; Parus.n.i is another name for Ira_vati_. Marudvr.dha = increased by the Maruts or storm-gods; A_rjiki_ya = Vipa_s'a; Sus.oma_ = Sindhu; Nirukta 2.26; cf. Muir's Sanskrit Texts, vol. 2, p. 355; a verse is inserted here in some MSS, not noticed by Sa_yan.a: "Those who are drowned at the confluence of the Sita and Asita go to heaven; the resolute people who abandon their lives (thus) enjoy immortality"]. The peoples who live close to the rivers are mentioned in the R.gveda; Vis'va_mitra crosses the Beas and Sutlej rivers --Vipa_s'a and S'utudri_ (RV 3.33.1). The battle with Bheda is chronicled in RV 7.18.9 and is held on the banks of the Yamuna and may precede the next battle at Parus.n.i.

R.si. families of the Rigveda and their A_pri_ Su_kta

Kan.va (Kevala-An:girasa) RV 1.13
An:girasa RV 1.142
Agastya RV 1.188
Gr.tsamada (Kevala-Bhr.gu) RV 2.3
Vis'va_mitra RV 3.4
Atri RV 5.3
Vasis.t.ha RV 7.2
Kas'yapa RV 9.5
Bharata RV 10.70
Bhr.gu RV 10.110

The only a_pri_ su_kta for Soma is composed by r.s.i Asita Ka_s'yapa or Devala Ka_s'yapa. [The other nine a_pri_ su_ktas are dedicated to Agni]. Soma comes from both A_rji_ka and S'aryan.a_vat

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(RV 8.64). If A_rji_ka is close to Kashmir, S'aryan.a_vat is indeed the root compound from which the term 'Haryana' is derived and given to the State south of the Punjab. Bhr.gu were in Kapa_lamocana on the Sarasvati_ and in A_narta, Gujarat.

S'aunaka, the Kulapati, who had index the Veda-s, had attracted to Naimis.a a concourse of scholars to discourses and disputations on religious and philosophical issues. The r.s.i-s took their abodes on the bank of the River Sarasvati_ upto Samantapan~caka. At the end of 12 years, they visited sacred shrines around Bha_rata. (MBh. 9.37.41-45). This is a remarkable account of the movement of the r.s.i-s towards the West, towards River Sarasvati_. (MBh. 9.37.50) in the doab between River Sarasvati_ and River Dr.s.advati_.

River Sarasvati_ notes the despair and anxiety of the r.s.i-s to find ti_rtha-s to perform their austerities; she starts flowing her stream there and changes course for their sake and once again, started flowing westward. In Kuruks.etra region, the reservoirs of water from the River Sarasvati_ are known as Naimis.akun~ja or Naimis.i_ya. (MBh. 9.37.53-57). This westward migration of r.s.i-s is related again in the Vanaparvan where Naimis.akun~ja is located on the banks of River Sarasvati_ and treated as part of Kuruks.etra (Mbh. 3.83.109).

R.s.i An:giras states that by bathing in (River Gomati_) Naimis.a_ran.ya 'one is sure to ascend where, seated on a celestial car, one is sure to be filled with joy on being worshipped by the Apsara-s' (13.25.); 'one who bathes in Naimis.a, and offers oblations of water to the departed manes, controlling his senses all the while acquires the merit of a human sacrifice'. (MBh. 13.25.9). R.s.is perform Vis'vajit yajn~a for the Pan~ca_la kings. (MBh. 9.41.3-4).

[Rajendra Bihari Pandeya, 1964, Naimis.a_ran.ya in literature, in: *Journal of the American Oriental Society*, Vol. 84, No. 4, October-December].

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The geneaology of Bharata is summarised in the following table:

Bharata	
Pijavana	
Devava_ta	
Devas'ravas	
Sr.njaya	
Divoda_sa	
Vadhryas'va	
Pratardana (and son Ks.atras'ri_)	**Purukutsa (perhaps a contemporary of Suda_sa) (son of Durgaha)**
Suda_sa	
Sahadeva	**Trasadasyu (son of Purukutsa_ni_)**
Somaka	**Tr.ks.i (son of Trasadasyu)**

Pu_ru and Nahus.a were settled on the banks of the River Sarasvati_ (RV 7.96.2; 7.95.2). In RV 7.8.4, 'where a Vasis..ha proclaims the victory o the Bharatas over a Pu_ru. Hence, the Pu_us must have exended their territories upto the Yamuna_ and Parus.n.i_, and seem to have spoken a different dialect than that of the Bharatas. In RV 7.18.13 they are called mr.dhrava_c, which means 'speaking a Barbarian tongue' rather than 'talking disdainfully...' (Hillebrandt, vol.1, p. 352). Agni overcame Pu_ru in battle (V 7.8.4) ; in RV 7.18.13, conquer in battle the ill-speaking man: pu_rum vidathe mr.drava_cam; there are various interpretations of the term, 'mr.drava_cam', for e.g., 'speech that is difficult', 'speech that is unintelligible', 'speaking a barbarian tongue' or 'talking disdainfully'. These two r.cas may be seen as references to Bharata battling the Pu_ru, i.e. an internicine conflict. (Divoda_sa is a Pu_ru in RV 1.130.7). Since the scene of the battle is described as taking place on the banks of the River Parus.n.i_ (River Ravi), there is emphatic evidence in the r.cas of the R.gveda that the Pu_ru and Bharata dwell close to the banks of the River Sarasvati_ as the extension of the domain takes the battling groups of people upto the left bank of the River Parus.n.i_.

[See Hillebrandt, vol. 2., pp.352-353: 'The events describedn in books III and VII which take place mostly farther in the east on the Parus.n.i_, Yamuna_, Vipa_s and S'utudri_ make it improbable that the Sarasvati_ mentioned in VIII.95, 96, on the banks of which the Pu_rus dwelt, can still be identical with the Arachotos. Howsoever exuberant the description might appear, there is no other possibility but to locate them on the small river in the Madhyades'a, which was considered sacred in later periods...I do not see why we should not read a tradition which reaches upto the RV into the RV itself or why we should not be permitted to consider a river which is called sacred in the RV and which, according to other indications, conforms to the later Sarasvati_ in its geographical position as really identical with the later Sarasvati_.'] Bharata's descendants were called the Bharatas or Bha_ratas...the main line (dynasty) at Hastina_pura and those of the Dvimi_d.has and of North and South Pa_n~ca_la, were Bha_ratas. (Pargiter, p. 113; MBh. 1,2,371; 62,2320-1; 74,3123; 4,2,912; 13,76,3690; Va_yu 99,134; Matsya 24,71; 49,11; Br. 13,57; Hv 32,1723; Ajami_d.ha had two sons Dus.yanta and Parames.t.hin, and from them came all the Pa_n~ca_las). [Dus.yanta is variously called: Dus.manta, Dus.s.anta, Duhs.anta; cf. Vedic Index, 1,382; "These forms can be reconciled through a Prakrit form Dus.s.anta or Dussanta, of which they are different Sanskrit equivalents, the form Dus.yanta being probably right and the brahmanic one misaken." (Pargiter, p. 129)]. S'akuntala (whose father was a Vis'va_mitra) lived in the hermitage of Kan.va Ka_s'yapa. She married the Paurava king Dus.yanta and was the mother of King Bharata. "Kan.va is said to have been the chief priest at Bharata's sacrifices, and Bharata gave him gifts; and he is no doubt this Kan.va (or perhaps his son)." (Pargiter, p. 232). Bharata's territory stretched from the River Sarasvati_ to the Ganga. (MBh 7,68,2384; 12,29,939).

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Maritime, riverine civilization

Sea-faring merchants of Sarasvati Sindhu

Mesopotamian economy was characterised by acquisition of resources from distant locations even preceding the neolithic period; for example, seashells were obtained from the Mediterranean and are found as far back as 15,000 BCE.

Meluhhans from Sarasvati Civilization used the rivers Sarasvati and Sindhu as waterways to traverse further into the Persian Gulf and along the long coastline of Bharat.

Meluhhan traders across the Persian Gulf

Although Anatolia has copper mines, copper is not obtained from this part of the country. The high costs of transport make copper out of Anatolia expensive. One prefers copper from the south, that is supplied by ship.

[Was the copper imported through Sumer, perhaps from the Khetri mines of Sarasvati-Sindhu doab?]

Mesopotamian records refer to the lands of Meluhha, Makkan, and Dilmun. Meluhha is identified with the Sindhu-Sarasvati Valleys, Makkan with the Makran and Omani coasts, and Dilmun with Bahrain, Failaka, and the adjacent Arabian coastline.:

- Sargon's inscription referring to Meluhhan ships docked at Akkad.
- References to a Meluhhan ship-holder and a Meluhhan interpreter.
- Gudea of Lagash inscriptions: 'the Meluhhans came up (or down) from their country to supply wood and other raw materials for the construction of the main temple of Gudea's capital.'
- References to luxury items being imported from Meluhha.
- References to a Meluhhan workers village.

By the Ur III Period, the Meluhhan (Harappan) workers residing in Sumeria had Sumerian names; Parpola, Parpola, and Brunswig comment that 'three hundred years after the earliest textually documented contact between Meluhha and Mesopotamia, the references to a distinctly foreign commercial people have been replaced by an ethnic component of Ur III society' (Parpola et al. 1977:152). One explanation offered for the absence of Mesopotamian products in Meluhha is that the products imported were perishable, such as 'garments, wool, perfumed oil, and leather products' from Sumer (Dales 1979:144). A gulf seal, perhaps of middlemen from Dilmun, was found by S.R. Rao at Lothal. Cylinder seals with characteristic indigenous motifs thereon were found at Sibri and Kalibangan. Thus traders from Meluhha has their own village in a far-off location maintained over a long span of time.

(Based on: Chris J.D. Kostman, M.A., *The Indus valley civilization in search of those elusive centers and peripheries*, Originally published in JAGNES, the *Journal of the Association of Graduates in Near Eastern Studies*.
http://www.adventurecorps.com/centperiph.html)

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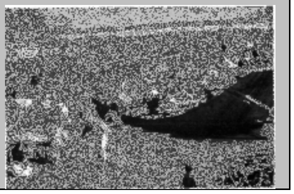
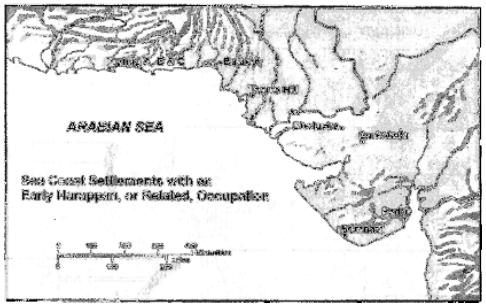
The riverine nature of the civilization is apparent from the long-distance trade established with Mesopotamia traversing the Persian Gulf. The type of boats in use even today on River Sindhu were used to traverse the Rivers Sindhu and Sarasvati and the Gulf, hugging the coastline.

Mohenjodaro.Sindhu River near Mohenjodaro. Boat and cart still plying here.Moulded steatite tablet showing boat, Mohenjo-daro.

Modern-day boat on River Sindhu





Sea-faring early Sarasvati, Meluhhan culture: Amri-Nal sea coast settlements "…inhabitants were well acquainted with the sea and its resources" (After Fig. 4.124 in G. Possehl, 1999, p. 618)

At Ras al-Junayz an inscription with four Indus characters was found incised on the shoulder of a painted jar. 'This locality occupies an even more strategic position on the coastal route from Karachi to the Horn of Africa…it seems increasingly likely that the Indus civilization contributed more to oceanic seacraft than any of the other proto-urban civilizations of the Middle East.' [M. Tosi, 1982, A possible Harappan seaport in eastern Arabia: R'as Al-Junayz in the Sultanate of Oman. Paper presented at the *First International Conference on Pakistan Archaeology*, Peshawar, March 1-4].

String of decorated carnelian, lapis lazuli and gold beads. UPM#30-12-573,PG 1422 (Courtesy of the University of Pennsylvania Museum). Carnelian bead decorated with white designs from the royal cemetery of Ur. Pear-shaped bead. UPM #35-1-77, Field # U 18880. PJ, Grave 57. This is evidence of contact between Gujarat (production centre of carnelian stones) and Ur, Mesopotamia.

The maritime/riverine nature of the Sarasvati Sindhu civilization is borne out by the archaeological finds of contacts with Sumeria, particularly in the trade of copper/bronze weapons exported from ancient India.
Rigveda has a number of allusions to the use of boats.

The vedic people had used ships to cross oceans: anarambhan.e... agrabhan.e samudre... s'ata_ritram na_vam... (RV. I.116.5; cf. VS. 21.7) referring to as'vins who rescued bhujyu, sinking in mid-ocean using a ship with a hundred oars (na_vam-aritraparani_m). There is overwhelming evidence of maritime trade by the archaeological discoveries of the so-called Harappan civilization, which can now be re-christened: Sarasvati-Sindhu civilization. Some beads were reported to have been exported to Egypt from this valley (Early Indus Civilization, p. 149); Sumerians had acted as

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intermediaries for this trade (L. Wooley , The Sumerians, pp. 46-47; cf. Ur Excavations, vol. II, pp. 390-396).which extended to Anatolia and the Mediterranean.

Boats drown in the river Sarasvati when the river was in spate (RV. 6,61,3); Devi Aditi comes in a boat for the reciters to board (RV. 10,63,10); Soma, the king of the waterways, who covers the universe as a cloth, has boarded the boat of sacrifice; the su_rya descends the heavens on a boat (RV. 1,50,4; 5,45,10; 7,63,4; 10,88,16,17). Sudasa built an easily pliable boat to cross the Purus.n.i river (RV. 7,18,5); Agni is a boat which carries the sacrificers over the difficult path of sacrifice (RV. 1,9,7, 7-8: 5,4,9); Agni is the boat of the reciters in troubled times (RV. 3,29,1), to ford enemy lines (RV. 3,24,1); Agni is the carrier-boat of oblations to the gods (RV. 1,128,6); Agni is the boat of all wishes (RV. 3,11,3); Indra was like a ferry-boat (RV. 8,16,11); Indra protected the boats (RV. 1,80,8); Indra is invoked to carry the reciters over the ocean of misfortune (RV. 3,32,14); Indra takes the reciters in his boat across the ocean (RV. 8,16,11); Indra saved the ship-wrecked Naryam, Turvasu, Yadu, Turviti and Vayya (RV. 1,54,6); Indra-Varun.a sail on the boat on the celestial ocean (RV. 7,88,3); Purus.an's golden boat moves on the sky (RV. 6,58,3) Varun.a's boat will carry the reciter on to the mid-ocean of the sky (RV. 7,88,3); Maruta helped the reciters to cross the ocean of war in a boat (RV. 5,54,4); Maruta was compared to a tempestuous ocean in which had sunk a laden ship (RV. 5,59,2); there are references to: house boat (RV. 1,40,12); long boat (RV. 1,122,15); well-furnished boat with oars (RV. 10,101,2); boats carrying foodgrains for overseas markets (RV. 1,47,6; 7,32,20; 7,63,4); boats fit to cross the ocean with oars (RV. 1,40,7); ocean-trading boats (RV. 1,50,2). [See also Swami Sankarananda, Hindu States of Sumeria, Calcutta, K.L.Mukhapadhyay, 1962 for the story of Bhujyu who was the son of a king named Tugra (a worshipper of As'vina) whose boat was sunk in the mid-ocean, p. 32].

Riches are obtained from the samudra (i.e. by maritime trade) (RV. 1,47,6); there were two winds on the ocean, one to put the boat to the seas and the other to bring it to shore (RV. 10,137,2).

The association of Pu_s.an and Sarasvati_ can be explained: both divinities are connected with paths: one is concerned with the maritime routes and paths from the Heavens and the other is a riverine path linking to maritime regions; thus both Pu_s.an and Sarasvati_ are purveyors of 'paths' for the civilization. Pu_s.an is a_ghr.in.i, 'glowing'; he is gopa_, the herdsman (RV10.17.3;139.1). Pu_s.an's golden ships move across the oceans, move in the air as he goes as an envoy of Su_rya. (RV 6.58.3: ya_s te pu_s.an na_vo anta_h samudre hiran.yayi_r antariks.e caranti ta_bhir ya_si du_tya_m su_ryasya ka_mena kr.ta s'rava icchama_nah). Pu_s.an is offered the karambha, a gruel made from barley (grown on the banks of the River Sarasvati_): ya enam a_dides'ati karambha_d iti pu_s.an.am na tena deva a_dise (RV 6.56.1; cf.RV 3.52.7). A male goat is also offered to Pu_s.an (RV 1.162.3-4); he protects the cows and horses and knows all the paths: pathas pati (RV 6.53.1; he grants pathya_ svasti: RV 10.59.7; 17.5). He had a beard (RV 10.26.7) and braided hair (RV 6.55.2); a goad (as.t.ra_, lance: RV 6.53.9) was placed in his hand; RV 1.42.6 adorns him with a golden axe (hiran.yava_s'i) and a dagger (a_ra_: RV 6.53.5 pari_ tr.ndhi pan.i_na_m a_ra_ya hr.daya_; Amarakos'a notes (2.10.35) explains a_ra_: carma khan.d.ana_rthah s'astrabhedah) to pierce the heart of the enemies. "The worshippers of Pu_s.an lived in the vicinity of the Sarasvati_. Book VI takes us to the banks of the western Sarasvati_ and book VII, on the other hand, to the area of Kuruks.etra, to the holy Sarasvati_ of the middle country. There at the Arghandab in Arachosia, Vadhryas'va's son Divoda_sa fought against the Pan.is, Pa_ra_vatas and Br.saya, and the river of the country 'who consumed the Pan.is' (RV 6.61) stood by his side as a guardian deity. In the same book which thinks of the Pan.is with special hatred we see Pu_s.an 'who pierces the Pan.is' at the centre of the cult, and he is mentioned once in the Sarasvati_ hymn also (RV 6.61.6). Pu_s.an and

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Sarasvati_ occur side by side elsewhere too; RV 6.49.7 Sarasvati_; 8 Pu_s.an; RV 17.3-6 Pu_s.an; 7-9 Sarasvati_; 65.1 (Va_yuh) Pu_s.a_ Sarasvati_. Their association has been continued especially in liturgical texts. (TS 1.2.2; 6.1.2.2: sarsvatyai pu_s.n.e gnaye sva_ha_; TBr 2.5.3.3 pu_s.a_ no gobhir avasa_ sarasvati_)."[Alfred Hillebrandt, 1927, *Vedische Mythologi*e, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, pp. 209-211]. Sarasvati_ is associated with the ancestors and hence is extolled in the Yamasam.hita_ (RV 10.17.7: sarasvati_m devyanto havante sarasvati_m adhvare ta_yama_ne sarasvati_m sukr.to ahvayanta sarasvati_ da_s'us.e va_ryam da_t). In R.ca RV 10.17.8 the Manes, approaching the yajn~a in the south, invoke Sarasvati_ (sarasvati_m ya_m pitaro havante daks.in.a_ yajn~a_m abhinaks.ama_n.a_h). AV 7.68.2 is emphatic in associated Sarasvati_ with the pitr.s: (AV 14.2.20: adha_ sarasvatyai na_ri pitr.bhyas' ca namas kuru).

The River Sarasvati seems to have been the substratum of the civilization, nurturing as it did over 2,000 (out of about 2,600) archaeological sites on the river basins of the Sarasvati-Sindhu doab. The River Sarasvati was also the locus of both the Vedic culture and the Harappan civilization. Given the continuity of the cultural traditions in Bha_rata into the historical periods, it is perhaps apposite to hypothesise that the rise of the Maurya and the S'a_tava_hana dynasties during a few centuries preceding the Christian era, was a direct legacy of the bronze-age Bha_rata. It may also be hypothesised that the seeds of the Maha_bha_rata war were sown by this civilization which made available weapons and armour using the hardened alloy, bronze. The Great Epic, the Maha_bha_rata which is a narration of the mighty war which took place in ancient India seems to be an echo of the Dasara_jn~a wars narrated in the R.gveda and certainly constitutes the sheet-anchor of Bha_rata's ancient history providing as it does geographical evidence of the River Sarasvati while describing Balara_ma's pilgrimage for 42 days along the River basin from Dwa_raka, through Somnath to Mathura (S'alya parva), offering homage to his ancestors in places such as Pehoa (Pr.thu_daka, Kuruks.etra), Ka_ra_pacava (Yamunotri), Plaks.apras'ravan.a (origin of River Sarasvati in Himalayan glaciers in W.Garhwal, Har-ki-dun (Svarga_rohin.i) valley in Uttara_n~cal) and Mathura (on River Yamuna). The wars fought to ensure the path of righteous conduct in social organization also enabled the formation of the Bha_ratam Janam as a ra_s.t.ra, (both are terms used in the R.gveda), i.e. Bha_rata as a Nation State with a unity of purpose -- the enthronement of Dharma (a word that is tough to translate into English; perhaps, 'a human way of life' or, 'transcendental ethical conduct' expected of every citizen, in every walk of life). This Dharma is referred to in later philosophical texts as sana_tana dharma or 'eternal, transcendental ethical conduct' which is as old as human civilization itself.

Mahabharata as history of Bharat

The historicity of the events described in the *Mahabharata* is validated by two evidences: one is based on tradition and the other is based on jyotis.a, i.e. astronomy of observed celestial events which may be called sky epigraphs. The dates of the events described in the *Mahabharata* are about 3000 BCE. This just pre-dates the mature phases of Sarasvati Civilization. The chronology of pre-history and ancient history of Bharat can thus be related as a sequence: Veda (pre-4th millennium BCE) – *Mahabharata* (4th millennium BCE)– Sarasvati Civilization (3rd and 2nd millennia BCE) – Maurya (1st millennium BCE).

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The evidence based on tradition is provided by the settlement in Har-ki-dun valley (i.e. lit. valley of the Divinities). The villagers who are called *parvati*-s, at Har-ki-dun village celebrate an annual festival; the divinity honoured in this festival is Duryodhana! Har-ki-dun is at the foothills of Bandarpunch massif (close to Svarga_rohin.i mountain), Western Garhwal, Uttaranchal, in the Himalayan ranges. This is the place of origin of Tamasa and Giri rivers which are tributaries of River Sarasvati and used to flow through the Bata divide between the Himalayan ranges and Siwalik hills to join the Markanda River, a trunk river joining with River Sarasvati at Pehoa (referred to as Pr.thu_daka in the *Mahabharata*, where Balarama offers homage to pitr.-s and where pilgrims perform s'ra_ddha ceremonies for ma_tr.-s), not far from Brahmasarovar, Kuruks.etra.

***Mahabharata* is a historical document**

The evidence based on jyotis.a is the set of astronomical observations recorded by Veda Vya_sa in relation to terrestrial events related to the *Mahabharata* episodes.

Mahabharata is the sheet-anchor of Bharatiya Itihasa. This was established using planetarium software to validate the celestial epigraphs observed and recorded by Veda Vya_sa in the Great Epic in an international colloquium held in Bangalore in 2003.

The consensus reached in the colloquium was that there were over 150 astronomical references in the critical edition of *Mahabharata* (compiled by Bhandarkar Oriental Research Institute) which could be classified by types of celestial events observed and recorded. The sky inscriptions or celestial epigraphs included: planetary/constellation positions on dates of specific events related to the war and starting nakshatra and ending nakshatra of the pilgrimage of Balarama along the River Sarasvati (described in the shalya parva), the injury to Bhishma and his passing away on the winter solstice day on shukla ashtami tithi in Rohini, position of S'ani in Rohini, occurrence of a solar eclipse on jyeshtha and an eclipse season of three eclipses in one month with a solar eclipse occurring between two lunar eclipses and the latter sequence of solar eclipse penumbral lunar eclipse occurring within 13 tithis (a rare celestial event indeed), recorded events of meteor showers and occurrence of comets (possibly including the Haley's comet mahaaghoraa) during the war which lasted 18 days.

Against this backdrop of consensus, scholars reached further consensus that the *Mahabharata* was a sheet anchor of the modern history of Bharat. Areas for further were identified as:

- the concept of yuga and mahayuga
- knowledge of comets among ancient Bharatiya scientists
- the need for compiling a critical edition of the *Mahabharata* astronomical references based on all variant readings and excluded verses listed as annexes in the Critical Edition and including the commentaries of Vadiraja and Nilakhantha and Madhvacharya's *Mahabharata Tatparya Nirnaya*
- further investigation of the reference to the occurrence of the war during night also on the 14th day of the war
- compilation and research on astronomical references in the *Vedas, Puranas and other astronomical texts.*

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Thus, the use of modern tools of planetaria software and satellite image analyses will help in re-writing of bharatiya itihaasa and reinforce the historicity of the great epics as basic reference documents for itihaasa, in terms of both kaalaganana and geography.

In a paper presented at the international colloquium held in Bangalore on Jan. 5 and 6, 2003 and organized by Akhila Bharatiya Itihasa Sankalana Yojana, Mythic Society and Indira Gandhi National Centre for Arts Southern Chapter, Dr. Achar conclusively proves that the observed celestial events on the sky, observed by Veda Vyasa were based on a variety of observations:

1. Lunar-solar-lunar eclipse sequence occurring within a period of one month and one lunar-solar eclipse sequence occurring within just 13 tithi-s;
2. A comet (Haley's comet) is observed on the sky;
3. Bhishma waits for the uttarayana punya kaala (winter solstice) and ashtami tithi to arrive before his soul departs from the mortal body;
4. Karna describes to Krishna the observatin of unusual planetary conjunctions -- almost all the seven planets coming together;
5. Balarama's pilgrimage starts on a particular tithi and nakshatra and ends after 42 days on a particular tithi and nakshatra. All such observations are found by Dr. Narahari Achar to be consistent with only one date: about 3000 BCE, i.e. about 5000 years ago. No other date matches so consistenly with all the astronomical observations or, what may be called, celestial inscriptions.

This finding is path-breaking and constitutes a watershed in our understanding of chronology in ancient itihasa of Bharat.

Firstly, it establishes the historic authenticity of *Mahabharata* as a sheet anchor of Bharatiya Itihas.

Secondly, Veda Vyasa should have recorded only observed celestial events when he provides precise astronomical details in the text. The observations should have been made from the banks of River Sarasvati close to Kurukshetra. Dr. Narahari Achar reconstructs the skies as seen by Veda Vyasa from this location close to Kurukshetra.

Thirdly, together with the scientific discovery of the River Sarasvati in north-west Bharat as ground-truth and not a myth, it is possible to state with authenticity that the modern history of Bharat begins with the historic document, the *Mahabharata* and the War which occurred on the banks of River Sarasvati.

Fourthly, Balarama's pilgrimage along the banks of River Sarasvati as described in 200 shlokas of Salya Parva of the *Mahabharata* was a historic event and provides a geographical account of northern Bharat.

Fifthly, the history of modern Bharat begins from about 3000 BCE, that is, from the Kaliyuga which is reckoned from this date, according to Bharatiya Kala Ganana.

Sixthly, there is no historic document in human history which records historical events with such astonishing accuracy, to the last tithi and nakshatra.

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Seventhly, this demonstrates the remarkable astronomical knowledge possessed by the rishis of Bharata, exemplified by Veda Vyasa as early as 5000 years ago and establishes Jyotisha which was evolved in Bharata, as an early astronomical scientific discipline.

Thus, using modern astronomy computer-based software tools, it is now possible to state that *Mahabharata* of Veda Vyasa is the earliest recorded history of Bharat and the modern history spans from over 5000 years of continuous, indigenous civilization. The chronology of Bharatiya Itihas should be reconstructed from this date and based on this historical document, and need not be based on foreign travellers' accounts or theories propounded by western indologists.

The following key dates are found to be consistent with the sky inscriptions observed by Veda Vyasa:

- Krishna's departure on Revati Sept. 26, 3067 BCE
- Krishna's arrival in Hastinapura on Bharani Sept. 28, 3067 BCE
- Solar eclipse on Jyeshtha amavasya Oct. 14, 3067 BCE
- Krittika full moon (lunar eclipse) September 29, 3067 BCE
- War starts on November 22, 3067 BCE (Saturn in Rohini, Jupiter in Revati)
- Winter solstice, January 13, 3066 BCE
- Bhishma's expiry, January 17, 3066 BCE Magha shukla ashtami
- A fierce comet at Pushya October 3067 BCE
- Balarama sets off on pilgrimage on Sarasvati on Pushya day Nov. 1, 3067 BCE
- Balarama returns from pilgrimage on Sravana day Dec. 12, 3067 BCE
- On the day Ghatotkaca was killed moon rose at 2 a.m., Dec. 8, 3067 BCE

In *Kaus'i_taki Brahmana* there are two statements:

> **sa vai ma_ghasya_ma_vasya_ya_mupas'asatyadangabha_vai sannupeme** (KBr. XIX,3)
> **mukham va_ etat samvatr.sarasva yatr. pha_lguni_ paurn.ama_si_ mukhamuttare puccham pu_rve** (KBr., V,1)
> [cf. S'Br. VI.2.2.18; Taittiriya Br. 1.1.2.8].

These observations indicate that

1. the sun reached the winter solstice at the full moon Ma_gha
2. the year was considered to be at its end at the full-moon at the star group Purva Phalguni_.

Dr. Phanindralal Gangooly notes: "From all of which we gather that the summer solstitial colure of the earliest Brahmana period when this was the case was 3100 BCE (PC Sengupta, Age of the Brahmana, in *Indian Historical Quarterly*, Vol. X, No.3, 1934). The vernal equinoctial colure passed through the star Rohini or Aldebaran. In the later Vedic times the sun's turning north very probably took place a fortnight earlier. The S'atapatha Brahmana says that 'some want to have a few nights more; if they want some more then they should begin the sacrifices on the night on which the moon becomes first visible before the full moon at the Phalgunis.' (S'Br. II,6.4 Br. 11). These sacrifices were begun as soon as the sun turned north. It shows that the solstices had precessed by about 15 degrees and that the date when this took place was 2000 BCE. The earliest Brahmana period may be called the Rohini-Phalguni_ period. Even at this time the five early luni-solar cycle was known. (pancas'a_radauyo va_ eva yajn~a iti: TBr. 2.7.11). The calendar was luni-solar in

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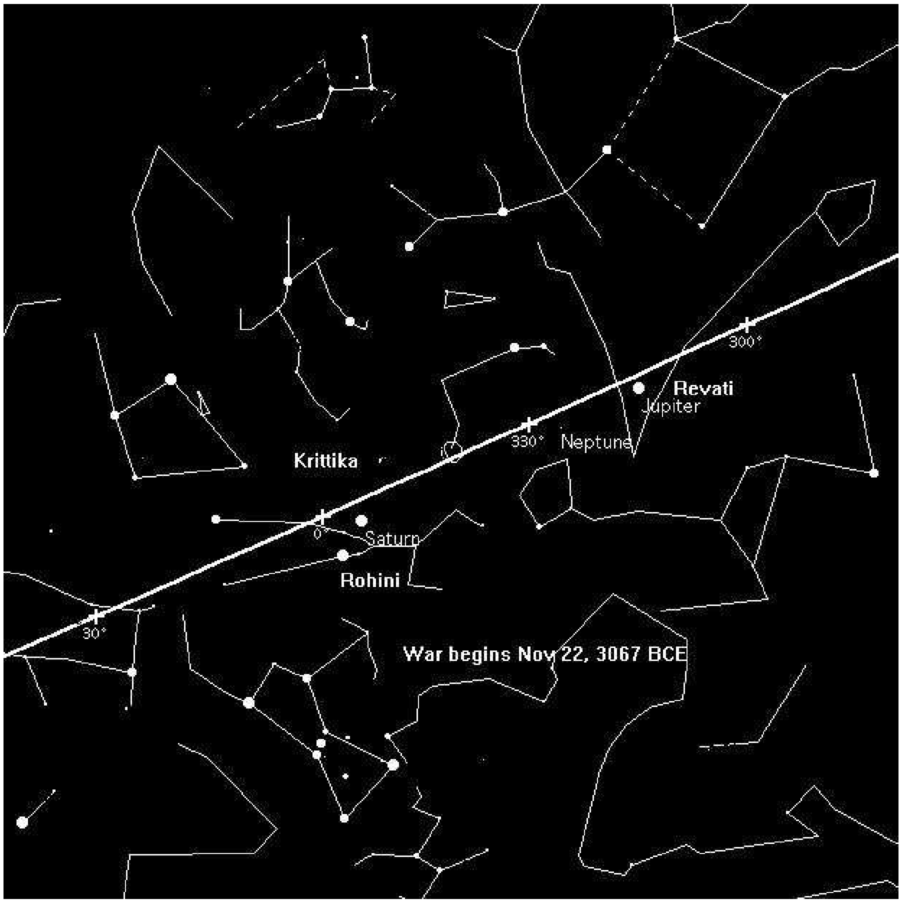
characte. The chief signals for the beginning and the end of the year were the full-moon at the U. Phalguni_ and that at the Purva Phalguni_ respectively; from which the intercalary month were detected." (Phanindralal Gangolly, ed., *The Surya SIddhanta, a text-book of Hindu Astronomy*, Delhi, Motilal Banarsidass, first edn. 1860, repr. Delhi 1989, Introduction, pp. xxxv-xxxvi).



War starts, November 22, 3067 BCE

Events on the sky constituted the clock and the calendar for Veda Vyasa recording observed celestial and terrestrial events.

With the desiccation of the River Sarasvati which supported the substratum of the civilization since the basin was close the sources of copper in Khetri mines, the vra_ta (troops) moved away from this river basin towards the Ganga-Yamuna doab, southwards to the Godavari river valley (to constitute the vra_tya of the Vedic tradition -- the magadha minstrels and the su_ta, the differentiated functionaries, the armourers and rathaka_ra who became the ratnins of the ra_s.t.ra) and beyond and westwards to Haraqvaiti (< Sarasvati) region (to constitute the set of kavi-s and karapan-s of the Avestan religious and Iranian national tradition). The memory of the great river Sarasvati ensures all over Bha_rata and neighbouring regions and even in Croatia where the word croats may be derived as sarasvati > haraqvaiti > hravat > kravat > croat; the word hravat is attested as a region in the Behistun inscription of Darius dated to ca. 6th cent. BCE.

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R.gveda (r.ca 3.53.12) uses the term, 'bha_ratam janam', which can be interpreted as 'bha_rata folk'. The r.s.i of the su_kta is vis'va_mitra ga_thina. India was called Bha_ratavars.a after the king Bharata. (Va_yu 33, 51-2; Bd. 2,14,60-2; Lin:ga 1,47,20,24; Vis.n.u 2,1,28,32).

An evaluation of textual references on 'five peoples' and the enunciation of the nation as Bha_ratam Janam (the Bha_rata folk) in R.gveda[ii] and of archaeological/geological evidence on the River Basins of Sarasvati and Sindhu dated to periods earlier than and ca. 5500 years Before Present (BP). We will take a glimpse into the genealogy of the Pu_ru folk and the relative chronologies of other folk: Dasyu, Druhyu, Anu, Yadu, Turvas'a and the relative chronology of the Vedic Soma and Avestan Haoma traditions.

Painted Grey Ware (PGW) culture is dated between ca. 1100 and 800 BCE, and is found in a continuous region from the Punjab, the Sarasvati River Basin and the mid-Ganga region. Settlements, like the large number of Sarasvati settlements, were villages. (DP AGrawal, 1982, *The archaeology of India*, Scandinavian Institute of Asian Studies, Monograph Series 46, London). PGW was overlaid by Northern Black Polished Ware (NBPW) circa 600 BCE and until the first century BCE. A few PGW sites are stratified over a deposit of Ochre Coloured Pottery (OCP) dated to circa 2600 to 1100 BCE often associated with copper hoards of the Ganga valley. Black-and-Red Ware (BRW) is overlaid by PGW at Atranji-khera and at Bhagawanpura, PGW overlays Late Harappan settlement. It is a polemical exercise to isolate the layers of pottery types and relate them to any intruding or immigrant I-E speakers. It is a reasonable hypothesis that these pottery layers were simply regional variations in styles of an indigenously evolving Bharatiya civilization.
In the Indian tradition, Bharata's territory stretched from the River Sarasvati_ to the Ganges (MBh 7,68,2384; 12,29,939; cf. Pargiter, p. 273. Early Bharata were in the northern stretches of the River Sarasvati_:

RV 3.023.04 I place you in an excellent spot of earth on an auspicious day of days; do you, Agni, shine on the frequent (banks) of the Dr.s.advati, A_paya_ and Sarasvati_ rivers. [In an excellent spot of earth: pr.thivya_ il.a_yaspade, in the footmark of the earth in the form of a cow; i.e. on the northern altar; frequented banks: ma_nus.e, relating to man or to Manu; implies, manus.yasam.caran.avis.aye ti_re, on a bank, a place frequented by men; the Dr.s.advati_ and Sarasvati_ rivers are well known (r.s.ayo vai sarasvatya_m satrama_sata : *Aitareya Bra_hman*.a 2.19)].

The yajn~a for the da_rs.advata session has to start near the confluence of river Dr.s.advati_ at Parin.ah. There are many references in S’an:kha_yana S’rauta Su_tra (Varadattasuta A_narti_ya and Govinda, Commentators., Alfred Hillebrandt, ed., 2 vols., Reprint, Delhi, 1981):

sarasvatya_ vinas’ane di_ks.a_ sa_rasvata_na_m (13.29.1)
prati_pam pu_rven.a paks.asa_ yanti (13.29.11)
apyaye dr.s.advatya_h (13.29.14)
samvatsare pari_n.ahyagni_na_dha_ya dr.s.advatya_ daks.in.ena
ti_ren.a_gneyena_s.t.a_kappa_lena s’amya_para_se s’amya_para_se yajama_nja aiti (13.29.29)
trih plaks.a_m prati yamuna_mavabhr.thamabhyavayanti (13.29.30)

Jaimini_ya Bra_hman.a refers to Parin.ah as the name of a lake in the lower half of Kuruks.etra.

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tes.a_m u tes.a_m pari_n.aditi kuruks.etrasya jaghana_rdhe saraskandantam di_ks.a_yai te pra_n~co yanti samaya_ kuruks.etram (Raghuvira, ed., Nagpura, 1954: 2.300**).**

La_t.ya_yana S'rauta Su_tra (10.19.1) explains Parin.ah as 'bhu_merunnataprades'ah' or risen ground:

> **samvatsara_du_rdhvam pari_n.am na_ma sthali_ kuruks.etre tasya_magni_na_dha_ya**

This interpretation seems to be confirmed by Ka_tya_yana S'rauta Su_tra (24.6.32):

Kuruks.etre parin.ahi sthalegny a_dheyamanv a_rambhan.i_y a_ntam bhavati

3.023.04 I place you in an excellent spot of earth on an auspicious day of days; do you, Agni, shine on the frequent (banks) of the Dr.s.advati, A_paya_ and Sarasvati_ rivers. [In an excellent spot of earth: pr.thivya_ il.a_yaspade, in the footmark of the earth in the form of a cow; i.e. on the northern altar; frequented banks: ma_nus.e, relating to man or to Manu; implies, manus.yasam.caran.avis.aye ti_re, on a bank, a place frequented by men; the Dr.s.advati_ and Sarasvati_ rivers are well known (r.s.ayo vai sarasvatya_m satrama_sata, the seers performed a sacrificial season on the Sarasvati_; they drove away Kavas.a Ailu_s.a from the soma : Aitareya Bra_hman.a 2.19)].

The north-western boundaries are indicated by the sequence of rivers mentioned in RV 10.75: tr.tsama_, susartu, rasa_ (a tributary of Sarasvati_ in the Himalayas?), s'vetya_, kubha_, gomati_, mehatnu, krumu. The limits seem to stretch from the Himalayas to the northern areas of the modern Sind. [Gairiks.ita-- RV 5.27 was a descendant in the Pu_ru lineage; the name is indicative of a link with a mountainous region, perhaps the Himalayas]. cf. RV 1.112.12; 5.43.9; 10.75.6 Zimmer, AL, 15-16; Macdonell and Keith, *Vedic Index*, II.209. Rasa_ may be a riveron the Punjab side of the Hindu Kush. S'Br 12.6.1.41notes that only Vasis.t.has, the priests of the Tr.tsu-Bharatas had the right to assume the duties of the Brahman; the linking of Tr.tsu and Bharata indicates the possible location of the River Tr.tsama_. Maruts march forth from the west towards the east, beyond Rasa_, Kubha_, Krumu, Sarayu_ (RV 5.53.9); Maruts are located close to the desert, close to the River Sarasvati_. [cf. the Marusthali_ = the Great Indian Desert].

The following text may be interpreted in reference to the movement of the people away from the River Sarasvati_ as the river started desiccating, a movement from west/northwest to east -- towards the Gan:ga_-Yamuna doab: BS'S 18.44: 397.9, **pra_m: a_yuh pravavra_ja tasyaite kuru-pan~ca_la_h ka_s'i_ videha_ ity etad a_yavam pratyan ama_vasus tasyaite ga_ndha_rayas pars'avo rat.t.a_ ity etad a_ma_vasyam,** 'Ayu went eastwards. His (people) are the Kuru-Pa_n~ca_la and the Ka_s'i-Videha. This is the a_yava (group). (His other people) stayed at home in the West. His people are the Ga_ndha_ri_, Pars'u and Arat.t.a. This is the ama_vasva (group).' Similarly, some references in R.gveda can also be interpreted as the movement of people from Gan:ga_ to the northern reaches of the River Sarasvati_ which continued to receive the monsoon waters from the Siwalik ranges: 'Indra...carry Yadu and Turvas'a across' (RV 6.45.1), 'they have crossed the rivers' (RV 4.30.17), 'have gone through narrow passages' (RV 6.47.20-21).

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RV 7.033.06 The Bharatas, inferior (to their foes), were shorn (of their possessions), like the staves for driving cattle, (stripped of their leaves and branches); but Vasis.t.ha became their family priest, and the people of the Tr.tsus prospered.

[People of the Tr.tsus: Tr.tsus are the same as the Bharatas. Sam.varan.a, the son of R.ks.a, the fourth in descent from Bharata, the son of Dus.yanta, was driven from his kingdom by the Pa_n~ca_las, and obliged to take refuge with his tribe among the thickets on the Sindhu until Vasis.t.ha came to them and consented to be the ra_ja_'s purohit, when they recovered their territory. Suda_s was an Aila king of North Pa_n~ca_la (hence, Ila_vr.ta vars.a); the tradition indicates that the Ailas came from the sacred mid-Himalayan region (Uttarakuru) into the Va_hlika_ country in the Punjab. Puru_ravas was succeeded by A_yu at Pratis.t.ha_na (Allahabad) and another son Ama_vasu founded a kingdom with capital at Ka_nyakubja (Kannauj). A_yu was succeeded by Nahus.a, whose son was Yaya_ti. Yaya_ti had five sons: Yadu, Turvasu, Druhyu, Anu and Puru.]

Locus of the battles described in R.gveda

R.gveda (r.ca by R.s.i Savya A_n:gi_rasa) refers to a battle involving 20 kings, involving A_yu, an ancestor of the Bharata; both the battles -- this battle and the battle of 10 kings involve Yadu-Turvas'a and Anu-Druhyu occur in Northwest India and the region is clearly the Punjab, stretching from the River Parus.n.i to the River Yamuna_, from the Ocean to Kuruks.etra, a region described as the centre of the world or the best region of the earth: vara a_ pr.thivya_h (RV 3.53.11). Ma_nus.a is a place (perhaps, a lake) in west of Kuruks.etra, where the Dasara_jn~a battle was fought (R.V 7.18.9; RV Khila 5.14.1; Jaimini_ya Bra_hman.a; cf. Avestan Manus.a). There is a lake named Manas in Taluk Manas, in Haryana, close to the River Sarasvati_. Similarly, S'a.ryan.a_vat is a pond in Western Kuruks.etra (JB)

"The association of the Bharadva_jas with the Pu_rus, with Divoda_sa, Sr.n~jaya and Br.bu leads us to the assumption that the Pu_rus or a part of them were settled not far away from the kingdom of Divoda_sa...in RV 7.8.4, a Vasis.t.ha proclaims the victory of the Bharatas over a Pu_ru. Hence, the Pu_rus must have extended their territories up to the Yamuna_ and Parus.n.i_, and seem to have spoken a different dialect than that of the Bharatas. In RV 7.18.13 they are called mr.dhrava_c, which means 'speaking a Barbarian language'...The events described in books 3 and 7 which take place mostly farthern in the east on the Parus.n.i_, Yamuna_, Vipa_s and S'utudri_ make it improbable that the Sarasvati_ mentioned in RV 7.95,96 on the banks of which the Pu_rus dwelt, can still be identical with Arachotos. However exuberant the description might appear, there is no other possibility but to locate them on the small river in the Madhyades'a, which was considered sacred in later periods." [Alfred Hillebrandt, 1927, Vedische Mythologie, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, pp. 351-352].

In the narration of the battle of ten kings --the dasara_jn~a battle – one key event reported is the crossing of the River Parus.n.i (River Ravi), the banks of which were broken through by the the opposing Turvas'a, Yaks.u (Yadu), Bhr.gu and Druhyu, Paktha, Bhala_na, Alina, Vis.a_n.in, S'iva (S'ibi); Bharata, led by Suda_sa, settle along the River Sarasvati_ and claim the region around Kuruks.etra:

A co-operating society of R.gvedic times

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R.gveda attests to a co-operating society which was nurtured on the banks of the River Sarasvati (which is adored as ambitame, nadi_tame, devitame -- best of mothers, best of rivers and best of godesses - in 72 r.ca-s of the R.gveda). R.gveda also attests to a society which sought to establish an understanding of the cosmic phenomena in relation to beings (pan~ca-janam or bha_ratam janam) using the process of yajn~a which became the dominant cultural heritage all over Bha_rata cherished for millennia and even today, in a remarkable cultural continuity spanning millennia, the stability of which has no parallel in any other civilization of the world. While exploring cosmic phenomena, battles and wars are used as metaphors of the yajn~a; the society of the R.gveda was in a flux of socio-economic organization, by arriving at a modus vivendi of relationship with material phenomena and nature; this social organization was such as to promote the peoples' advancement. Wars were fought to acquire wealth and riches.

RV 2.041.16 Sarasvati_, best of mothers, best of rivers, best of goddesses, we are, as it were, of no repute; grant us, mother, distinction. [ambitame, nadi_tame, devitame: the superlatives of ambika_, a mother, nadi_ , a river and devi_, a goddess].

2.041.17 In you, Sarasvati_, who are divine, all existences are collected; rejoice, goddess, among the S'unahotras, grant us, goddess, progeny.
2.041.18 Sarasvati_, abounding in food, abounding in water, be propitiated by these oblations, which the Gr.tsamadas offer as acceptable to you, and precious of the gods.

Sarasvati_ is among the 27 synonyms for a river (Hemachandra, Abhida_na cinta_man.i, 4, 145-146: nadi_, hiran.yavarn.a_, rodhovakara_, taran:gin.i_, saiva_livi, vaha_, hradini_, srotasvini_, nimnaga_, srota, nirjharin.i_, sarit, tat.ini_, ku_lan:kas.a_, va_hini_, kar.su_, dvi_pavati_, samudradayita_, dhuni, sravanti_, sarasvati_, parvataja_, a_paga_, jaladhiga_, ku_lya_, jamba_lini_.

Westward migrations out of Bharat

The evidence of the man.d.ala-s in BMAC archaeological sites and the man.d.ala created in a stu_pa with 24 spokes found at Sanghol, Punjab (Kushana period) point to the migrations of people away from the Sarasvati River basin during 2nd millennium BCE and during the historical periods. There is no archaeological evidence to assume that the man.d.ala of Gonur Tepe and other sites points to migrations of people from BMAC area into Bharat. The comparative analyses of Vedic and Avestan tradition clearly establishes the chronology: Vedic texts > Bra_hman.a-s > Avestan.

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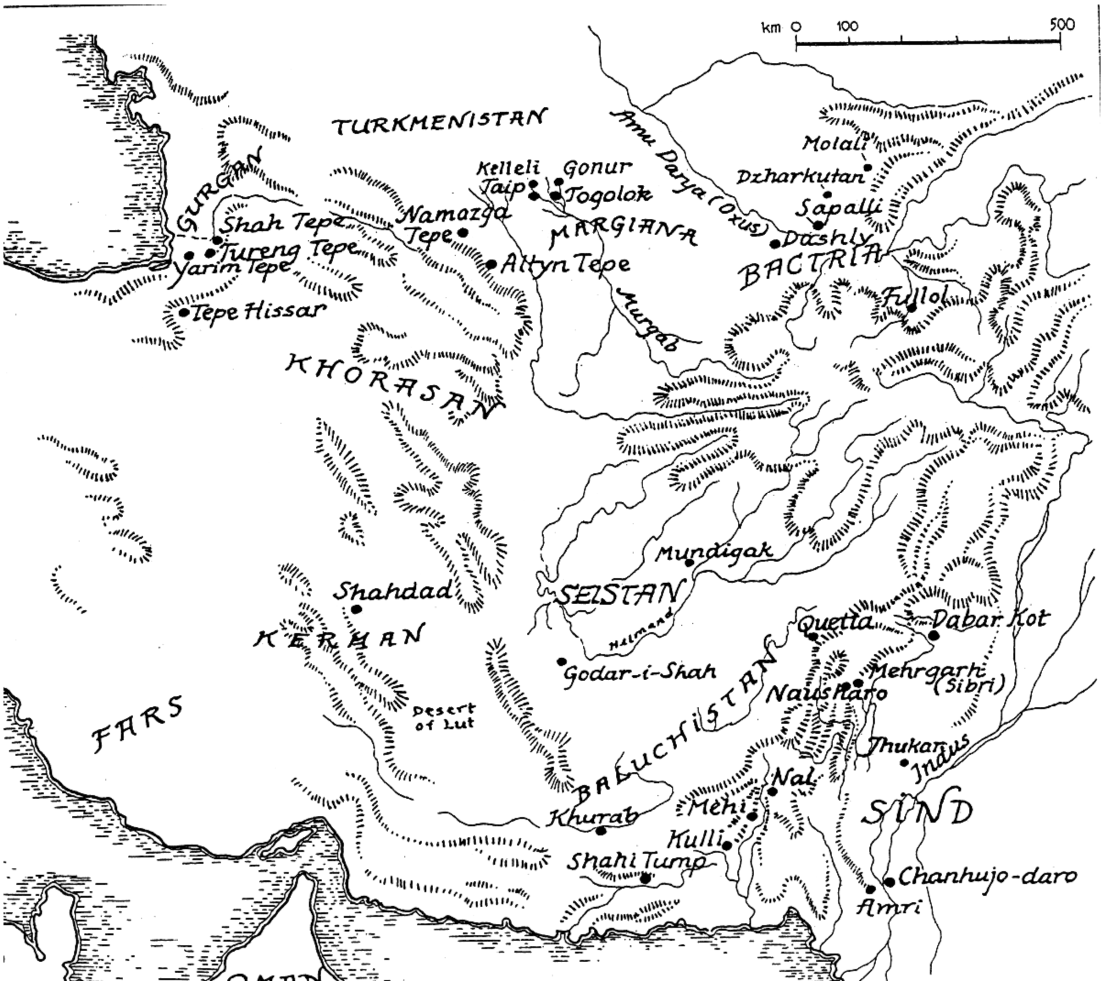

Map showing locations of Tepe Hissar, Gonur, Togolok, Mundigak, Shahi Tump, Kulli, Mehi, Nal, Amri, Nausharo, Jhukar, Chanhujodaro (After Fig. 6 in Asko Parpola, 1988, opcit.)

That the movement of man.d.ala concepts was from east to west (i.e. from out of Bharat) is exemplified by the cultural sequences discovered in the settlement of Nausharo. CC Lamberg-Karlovsky pointed out that a distinction should be made between two types of archaeological evidence suggestive of cultural contact or colonization (or expansion). If only a few types and numbers of artifacts characteristic of a cultue were found in another distinctive culture, the contact was very limited. However, if an entire cultural complex is recovered from the area of another culture, foreign colonization can be suggested, leading to major cultural transformations in the colonized area. (Lamberg-Karlovsky, C, 1986, Third millennium structure and process: From the Euphrates to the Indus and the Oxus to the Indian Ocean, *Oriens Antiquus* 25: 3-4, 189-219: 194f.) This is the case with the Bactria Margiana Cultural Complex in relation to Sarasvati Civilization. In the Su_tra period and the period of Tantric traditions, pre-dating Buddha, there could have been colonization of sites such as Dashly (BMAC) and Nausharo. Nausharo is a site with distinctly stratified settlements. A Late Harappan occupation at the top of the Nausharo mound was found in sequence. The uppermost level at Nausharo was found o be Jhukar culture which had been known

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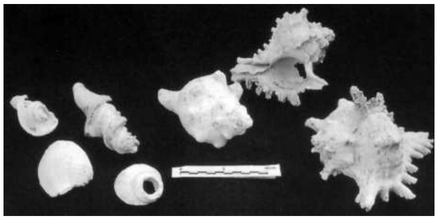
earlier at Chanhujodaro and Amri in Sind. In this site, traditions of Sarasvati Civilization continues without a break. The new elements were recognized as those associated with cemeteries of Sibri and Mehrgarh VIII. (Asko Parpola, 1988, opcit, pp. 202-203). That there was a distinctive cultural transformation caused by the cultural traits migrating out of Sarasvati Civilization can be seen from the glyptic parallels such as the depiction of snakes, eagles and conflict motifs which can be explained rebus as lexemes of Mleccha (Meluhhan).

Continuing tradition of s'ankha industry from 8500 years Before Present

The s'ankha industry in Bharat is based on an 8500-year, continuing maritime tradition.

	
Turbinella pyrum: s'ankha kr.s'ana (conch-pearl) Burial ornaments made of shell and stone disc beads, and ***turbinella pyrum*** (sacred conch, **s'an:kha**) bangle, Tomb MR3T.21, Mehrgarh, Period 1A, ca. **6500 BCE.** The nearest source for this shell is Makran coast near Karachi, 500 km. South. [After Fig. 2.10 in Kenoyer, 1998].	From Gulf of Kutch and Saurashtra: Spiney murex, *chicoreus ramosus* (a), knobbed whelk, *fasciolaria trapezium* (b), and sawn fragments of the sacred conch (**s'an:kha**), ***turbinella pyrum*** [After Fig. 5.21 in Kenoyer, 1998].
Parvati, wore conch shell bangles – **s'an:khaka --** created by Sage Agastya Muni and Divine architect Vis'vakarma. S'an:kha is a Kubera's treasure – one of the nine or nava-nidhi-s.	

Turbinella Pyrum is a species which is native to the coastline of Bharat. The tradition continues even today in Gulf of Khambat (near Surat) and in Gulf of Mannar (near Tiruchendur). West Bengal Handicrafts Development Corporation has an office in Tiruchendur to acquire s'ankha to make them into bangles. The annual turn-over of s'ankha products in Tiruchendur is Rs. 25 crores. Every Bengali marriage has to provide for s'ankha bangles to the bride.

The importance of s'ankha in the mature periods of Sarasvati civilization may be seen from the following archaeological artifacts:

Mohenjodaro: libation vessel made from *turbinella pyrum*. Spiralling lines were incised and filled with red pigment. The vessel is used to anoint kings and to dispense sacred water	*Turbinella pyrum* conch shell trumpet. Hole at apex is roughly chipped. Used to call people for battle or ritually throughout South and Southeast Asia. Essential component of Hindu

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or milk. Used even today for ritual oblations and to dispense medicinal preparations.[After Fig. 6.38 in Kenoyer, 1998; J. M. Kenoyer, 1983, Shell working industries of the Indus Civilization: an archaeological and ethnographic perspective, PhD diss., UCAL, Berkeley]. 11.4 X 5.4 cm	and Buddhist traditions, one of 8 auspicious symbols. 9.66 X 5.1 cm. Harappa; Lahore Museum, P501
Wide bangle made from a single conch shell and carved with a chevron motif, Harappa; marine shell, *Turbinella pyrum* (After Fig. 7.44, Kenoyer, 1998) National Museum, Karachi. 54.3554. HM 13828.	Seven shell bangles from burial of an elderly woman, Harappa; worn on the left arm; three on the upper arm and four on the forearm; 6.3 X 5.7 cm to 8x9 cm marine shell, *Turbinella pyrum* (After Fig. 7.43, Kenoyer, 1998) Harappa museum. H87-635 to 637; 676 to 679.

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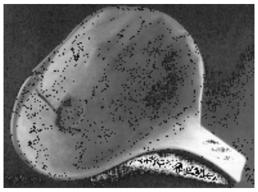
A skilled sawyer of s'ankha, Calcutta. Kr.s'a_nu, a bowman; shell-cutter with a bow saw

RV 1.112.21 With those aids by which you defended Kr.s'a_nu in battle, with which you succoured the horse of the young Purukutsa in speed, and by which you deliver the pleasant honey to the bees; with them, As'vins, come willingly hither. [Kr.s'a_nu are somapa_las, vendors or providers of Soma; hasta-suhasta-kr.s'a_navah, te vah somakrayan.ah (*Taittiri_ya Sam.hita_*1.2.7); kr.s'a_nu = agni; purukutsa was the son of Mandha_ta_ and husband of Narmada_, the river; the text has only 'of the young', Purukutsa.is added]. S'an:khah kr.s'anah = pearl-shell won from the ocean and worn as an amulet (AV 4.10.1). S'ankhah kr.s'a_na mentioned in the R.gveda is a shell-cutting bowman.

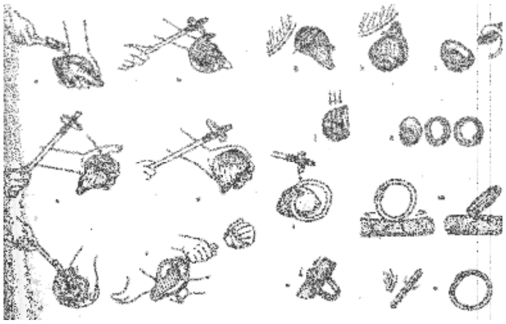
Sandstone sculpture of S'iva Bhairava, holding a conch in his left hand, 11th cent. S'ivapuram, South Arcot Dist., Bha_rata (Dept. of Archaeology and Ancient History, MS Univ., Vadodara).

Kanjari : a long blouse embroidered and with mirror work. Shell bangles are worn by a Kutchi woman, from wrist to shoulder -- a cultural heritage from the Sarasvati-Sindhu civilization as evidenced by the bronze statue found at Mohenjodaro wearing bangles in similar style.



Shell ladle perhaps used to pour librations. A hole in the shell has been plugged with lead to make it watertight. Harappa. Made from a spiny murex shell. Found in a burial. (After JM Kenoyer/Courtesy Dept. of Archaeology and Museums, Govt. of Pakistan).

Bet Dwaraka...A small rectangular seal (20 x 18 mm) of conch shell with a perforated button at the back was found in trench UW6 of Bet Dwarka. A composite animal moif representing the short horned bull, unicorn and goat are engraved in an anticlockwise direction.



Archaeological finds reinforce the importance of beads in ancient societies. **This adult woman from ancient Harappa was buried with two shell bangles on her**

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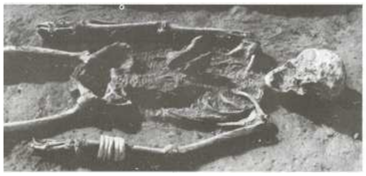
left arm and five carnelian beads at her waist. Harrappa Museum Pakistan. Courtesy of the Harrappa Archaeological Research Project.

***Turbinella pyrum* shell bangle manufacturing process. [a to f]:** preliminary chipping and removal of internal columella; [g to k]: sawing shell circlets; [l to n]: finishing the shell blank; [o]: final incising [After Fig. 5.23 in Kenoyer, 1998]

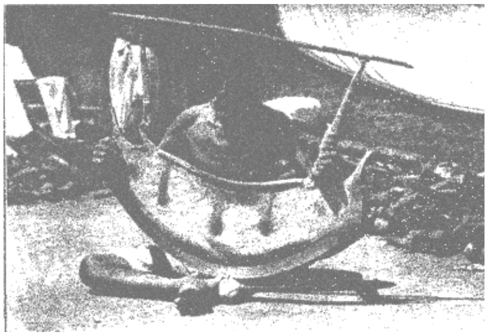


Skeleton of an adult woman at Harappa was buried with shell bangles on her left arm Harrappa Museum Pakistan. Courtesy

Among the finds of Mesopotamian civilization were shells used for decorative purposes. Harappa excavations have yielded shell ilays, beads, bangles, ladles, game-pieces, and shell necklaces. At Mohenjodaro was found s'ankha workers' quarters and heaps of oyster shells, pointing to possible use of pearls for ornaments and for long-distance trade. At Lothal were found complete shells, and a shell-working center (Rao, S.R., 1962: 22-3).

S'ankha is clearly an indigenously evolved industry and tradition and coast-based. S'ankha (turbinella pyrum) is found abundant along Gulf of Mannar, Gulf of Khambat, Gulf of Kutch and Makran coast and only in this coastline of Bharat, at 16 to 20 m. depths close to the coastline. The northern limits of the occurrence of the species is the mouth of River Godavari. It also occurs in Andaman islands (Nayar and Mahadevan 1974: 122-124). During low tide, the coral reef of Gulf of Kutch between Sacchna and Okha (a distance of 200 kms.) gets exposed and s'ankha is found close to coral reef patches. The s'ankha occurs at a depth of 4 to 6 m. in this gulf. (Pota and Patel 1991: 446). This zoological species is not found anywhere else in the world and thus constitutes a marker to identify products made and traded from Sarasvati Civilization, from the coastline of Bharat stretching from Makran coast in the west to the mouth of Godavari river on the east, along the long coastline.

Ancient chank bangle fragments from Gujarat and Kathiawar with one from Bellary (1516). (Foot-collection, Madras Museum) After Pl. IV in Hornell, opcit.



Sectioning chank shells in a Dacca workshop. After Fig. 2 in Hornell, opcit. S'ankha is certainly not a product brought in by the mythical invading or migrating Aryans – a myth created by some indologists without any archaeological evidence to support it. Vis.n.u is mentioned in the R.gveda but without the s'ankha adorning one of his hands. So, clearly, the s'ankha iconographic tradition is post-vedic, and attested archaeologically in Sarasvati Civilization, in 6500 BCE at Mehergarh, 300 kms. north of

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Makran Coast, north-west of Gulf of Kutch, close to the Amri-Nal cultural coastline.

"…Vishnu is almost certainly one of the gods borrowed from the indigenous people as his complexion is characteristically represented as dark-hued whenever his image is shown in colour…first notices occur in the two great Indian epics, the Ramayana and the Mahabharata. In these we get frequent reference to the employment of the chank as a martial trumpet by the great warriors whose more or less mythical exploits are recounted. Particularly is this the case in the Mahabharata, where in the Bhagavat-Gita we find the heroes heartening their forces to the fight with loud blasts on their battle-conches. Each hero has his famous conch distinguished…we read in the Bhagavat-Gita (verses 11 to 19) how the prelude to battle was the deafening clamour sounded by the leaders on their great conchs. 'The ancient of the Kurus, the Grandsire (Bhisma), the glorious, sounded on high his conch. 'The Lion's Roar'. Then conchs and kettledrums, tabors and drums and cowhorns, suddenly blared forth with tumultuous clamour. Stationed in their great war-chariot yoked to white horses, Ma_dhava (Krishna) and the son of Pa_n.du (Arjuna) blew their divine conchs. Panchajanya was blown by Hrishikes'a (Krishna) and Devadatta by Dhananjaya (Arjuna). Vrikodara (Bhim) of terrible deeds blew his mighty conch, Paundra. The king Yudhishthira, the son of Kunti, blew Anantavijaya; Nakula and Sahadeva blew their cochs Sughosha and Manipushpaka. And Ka_shya of the great bow and Shikhan.d.i, the mighty car-warrior, Drisht.adyumna and Vira_t.a and Sa_tyaki, the unconquered. Drupada and the Draupadeyas, O Lord of Earth, and Saubhadra, the might-armed, on all sides their several conchs blew. That tumultuous uproar rent the hearts of the sons of Dhritara_s.t.ra, filling the earth and sky with sound.' From the earliest times the conch has also been used in India to call the people to their sacrifices and other religious rites and as an instrument of invocation to call the attention of the gods to their ceremonies to be performed. With this intimate association with the chief religious rites, the people gradually came to reverence the instrument itself, and to adore and invoke it…In the ceremonies attending the coronation of great kings the chank naturally played a great part. (During coronation of Yudhishthira)…the king was to touch such auspicious articles as corn, white flowers, svastika, gold, silver and jewels…Krishna took in his hand the sacred conch-shell, which was filled with holy water, sprinkled the water over the heads of the king and queen…" (p. 117-126).

Together with the cakra, the discus wielded by Krishna, the s'ankha is an artefact associated with war; one is a weapon, the other is a trumpet calling the troops to arms and signaling the beginning of combat. Bhairava, a form of S'iva is also depicted carrying a sawn s'anka, a representation of the s'ankha industry, practiced by the vra_tya, the precursors of the ks.atriya-s and early worshippers of ekavra_tya Rudra, mentioned in the Atharva Veda. Kathiawar is the sacred land associated with the life of Krishna who is adorned with the Panchajanya s'ankha.

"…the S'anku Ta_li Vel.l.a_l.an-s, a section of the great Vellalar caste, who wear, according to Winslow, a representation of the chank on either side of a central symbol…Two other castes with the same marriage badge occur on the West Coast…This is an immigrant branch of Idaiyans known locally as Puvandans, settled in Travancore…Their tali is known as sankhu tali and a small ornament in the form of a chank is its most conspicuous feature. The other West Coast caste using a sankhu tali is that of the Thandan Pulayan, a small division of the Pulayan, who dwell in South Malabar and Cochin…Sixty years ago chanks constituted the currency of the Naga tribes…a cow was valued at ten chank-shells, a pig at two shells…on some coins issued by the ancient Pandiyan and Chalukyan dynasties of southern India a chank-shell appears as the principal symbol (Thurston, I, 328)…" (p. 146, p. 162, p. 166).

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"…in ancient days the cusom of wearing these pecular ornaments (of chank) was widely spread throughout the greater part of India and that bangle-workshops, equally widely scattered, stretched from Tinnevelly in the extreme south to Kathiawar and Gujarat in the north-west, through a long chain of factories located in the Deccan. Reference to ancient Tamil classics furnishes evidence scanty but conclusive of the existence of an import chank-cutting industry in the ancient Pandyan kingdom in the early centuries of the Christian era. Similar evidence is also extant of a widespread use of carved and ornamented chank bangles in former days by the women of the Pandyan country which may considered roughly co-extensive with the modern districts of Tinnevelly, Madura, and Ramnad, forming the eastern section of the extreme south of the Madras Presidency…Maduraikkanchi, a Tamil poem which incidentally describes the ancient city of Korkai (sea-port at the mouth of Tambraparni), once the sub-capital of the Pandyan kingdom and the great emporium familiar to Greek and Egyptian sailors and traders and described by the geographers of the 1st and 2nd centuries AD under the name of Kolkhoi. In one passage (LL. 140-144) the Parawas are described as men who dived for pearl oysters and for chank shells and knew charms to keep sharks away from that part of the sea where diving was being carried on…" (p. 42)

Dharmi, the Brahmin questions Nakki_rar:

An:kan:kulayariva_l.i neyppu_cip pan:kampat.a viran.t.u ka_lparappic cankatan-ai ki_rki_renavar-ukkun: ki_ran-o_ ven-kaviyai ya_ra_yumul.l.attavan-

Trans. Is Ki_ran fit to critize my poem? Spreading his knees wide, his joints loosened (by the labour), does he not saw chanks into sections, his ghee-smeared saw murmuring the while kir-kir?

The poem is rendered in the presence of the Pandyan king, Neduncer..iyan- II, contesting the competence of Nakki_rar, a Parawa, the poet-president of Tamil sangam in Madura. Nakki_rar responds:

can:kar-uppa ten:gal. kulan can:karan-a_rk ke_tu kulam pan:kamar-ac con-n-a_l par..uta_me can:kai yarintun.t.u va_r..vo_ maran-e_ nin-po_la virantun.t.u va_r..vatillai

Trans. Chank-cutting is indeed the calling of my caste; of that I am not ashamed. But of what caste is S'ankara? We earn our livelihood by cutting chanks, we do not live by begging as he did.

This is textual evidence for chank-cutting in Korkai, the principal settlement of the Parawa-s. This is how Hornell describes the finds of chank workshop at Korkai: "I unearthed a fine series of chank workshop waste -- seventeen fragments in all. The whole number were found lying on the surface of the ground in a place where old Pandyan coins have from time to time been discovered according to information gathered in the village. The fragments unearthed all bear distinct evidence of having been sawn by the same form of instrument, a thin-bladed iron saw, and in the same manner as that employed in Bengal in the present day. Eight fragments represent the obliquely cut 'shoulder-piece', six consist of the columella and part of the oral extremity of the shell and the remaining three are fragments of the lips -- all show a sawn surface, the positive sign of treatment by skilled artisans…It is also noteworthy that the huge funeral urns found in tumuli of the Tambraparni valley (at Adichanallur) have yielded a few fragments of working sections cut from chank shells, associated in the urns with beautifully formed bronze utensils, iron weapons and implements and gold fillets. So old are these tumuli that they are classed as prehistoric though it is obvious that the people of these days were skilful artisans in gold, bronze, iron and must have been contemporaries of historic

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periods in the story of Egypt and Mesopotamia. Ovari is the name of a small fishing village not far distant on the adjacent coast and may possibly be the Ophir of Solomon and the port whereto the fleets of Tarshish sailed to fright home the treasures of India…The localities in Gujarat and Kathiawar form a second well-marked geographical area, being situated around the Gulf of Cambay adjacent to where chanks are fished in the present day…Damnagar, Amreli Prant…a great number of chank bangles in a fragmentary condition were found…Babapur…situated 13 mile westward of Amreli…13 fragments of finished chank bangles…Ambavalli. Seventy-one fragments of broken bangles from an old site…numerous portions of sawn sections of chank shells…Va_la_bhipur (modern Walah)…chank bangle fragments…sawn working sections…Kamrej, 12 miles north-east of Surat. The summit of a small islet in the Tapti river at this place yielded three sawn shoulder slices (workshop waste) of chank sells and a single fragment of finished bangle…a broad and closely worked zig-zag groove…two fragments of sandstone hammers…Eight sites can clearly be indicated as probable centers of the chank-bangle industry in Gujarat and Kathiawar, namely -- (a)Sigam, Hiran valley, Baroda Prant, (b) Kamrej, on the Tapti, (c) Mahuri, on the left bank of the Sabarmati, Baroda State, with (d) Ambavalli, (e) Damnagar, (f) Kodinar, and (g) in and on the alluvium of the Shitranj river above Babapur, all four in Amreli Prant, Kathiawar, also (h) Va_la_bhipur in Vala State, Kathiawar…at the Ambavalli site, an iron knife with a tang was discovered…a chank-saw as is to-day in common use in Bengal chank factories for cutting patterns upon the bangles….In several other cases (Srinivasapur in Mysore, Havaligi Hill in Anantapur, and Bastipad in Kurnul) pieces of iron slag were found in association." (pp. 45-61).

Details of bangle manufacture. "The tool employed for breaking away the columella is a hammer fashioned on the principle of the well-known geologist's hammer, sharp-edged on the one side and square on the other. The shell is now ready for the sawyer, who sits on the earthen floor tightly wedged between two short stakes of unequal length driven into the ground. Against the longer, measuring some 15 inches above the ground, the worker's back is supported, while against the shorter, only 4 to 5 inches high, his toes are pressed. The space between the two stakes measures no more than 18 inches, hence the workman although he sits with his knees widely separate -- is very tightly jammed between the rests. This is found essential as it is necessary that the limbs should be rigid during his work, as his feet have to function as a vice during the sawing of the sections, the shell to be cut being placed between the right heel and the toes of the left foot. After the columella and lip of the shell are removed, a disc of hard wood is placed over the moth aperture of the shell to provide a firm purchase for the foot pressed against the side of the shell. The worker is now ready to begin sawing the shell into sections. For this purpose he is provided with a heavy hand-saw of great apparent clumsiness. The iron blade…is of a deep crescentic form ending in an attenuate horn at each end. A little way from each of these tapered extremities the end of a long iron tang is riveted to the back of the saw; the further ends of the two tangs are connected by a thin cane cross bar or handle lashed by twine to the tangs, which are covered with a serving of the same twine. IT is noteworthy that the tangs are not straight but have a hook-like bend near the attachment to the blade. The latter is a stout forged iron plate, 2 mm. Thick except for a distance of one inch from the cutting edge where it is worked down to a thickness of 0.6 mm. Between the tangs the back of the saw if protected by a piping of iron. A saw of this description costs Rs. 12, each workman providing his own. After sharpening, a new ssaw is adorned on each side of the blade with a number of red spots as auspicious marks. In beginning work, the shell is placed somewhat obliquely between the feet, the apex directed to the right and away from the worker, who places his left hand on one twine-covered tang of the saw and the other on the horn of the blade at the opposite extremity. Balancing the saw carefully in his hands, and at right angles to his body, he applies the edge to the shell and begins a vigorous to and fro movement of the saw from side to side, the course of the hands being

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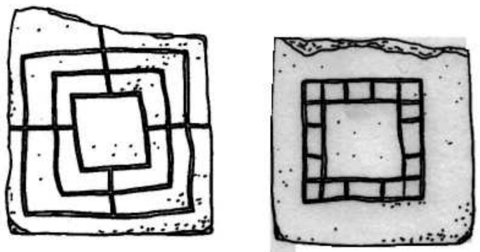
through a short arc of a circle at each swing. Several times he pauses momentarily to adjust the shell anew as the work progresses. On an average it takes 4 1/2 minutes to saw once through a shell…The rubbing down of the inner surface of the working circlet is accomplished in an ingenious manner by means of a wooden spindle 18 to 20 inches long, covered with an abrasive coating of fine river sand embedded in a rough lac basis…In Bengal and wherever in the adjoining provinces of Assam, Behar and Orissa…every married woman of all castes which are thoroughly Hinduised is bound to possess a pair of chank bangles laquered in vermilion as one of the visible tokens of her married state; the red sankha or shakha as it is called in Dacca is indeed as necessary of assumption during the marriage ceremonies as is the performance of that other Hindu custom of smearing a streak of vermilion on the forhead or down the parting of the bride's hair…bala and churi. The former are broad bangles worn on each wrist. The churi on the contrary is always quite narrow, generally 1/6 to 1/5 inch in widh, and usually of conventional scroll design worn in a set of three on each wrist…The section of the Kurmi caste found in Chota Nagpore and Orissa also wear chank bangles…in the hill tracts of Chittagong, we find the women of the Maghs, a race of Indo-Mongolian extraction and Buddhists by religion, using very broad unornamented sections of chank shells as bracelets…considerable demand for chank bracelets comes from Thibet and Bhutan…" (p. 91-107)

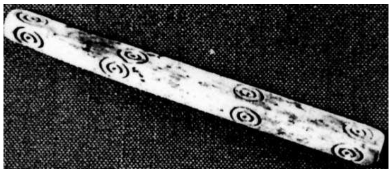
{James Hornell, 1914, *The sacred chank of India: a monograph of the Indian conch, turbinella pyrum*, Madras, Madras Fisheris Breau, Bulletin No. 7}.

Tradition of dice and gaming board

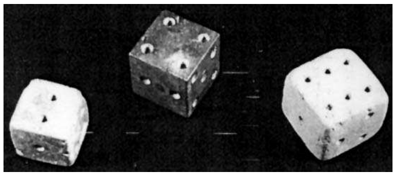


The game of dice is the critical wager which decides the between the Pa_n.d.ava and the Kaurava, elaborated in the Great Epic, the Mahabharata. This game of dice traces the tradition to the archaeologically attested artifacts of the Sarasvati Civilization.

Gaming board designs : Lothal (After Rao 1985, Fig. 104; Harappa (H94/5340-1).



Harappa. Cubical dice made of clay and stone. [After Fig. 6.40 in JM Kenoyer, 1998].



Incised ivory counter with 4 double circle-and-dot motifs on each side. Nausharo. Possibly used with other counters as gaming dice. Period III. Harappan 2300-2200 BCE. 6.81 cm. Long. Dept. of Archaeology, Karachi EBK 5656 [After JM Kenoyer, 1998, p. 214].

Cakra samvara, man.ibhadra: protector of lapidary crafts

"…Sontheimer has shown, Mârtanda Bhairava is identified with the folk-deities Mhasobâ, Birobâ and especially Khanobâ in the Deccan, where he often resides as a snake within the termite mound, which is itself identified as his mother Gangâ-Sûryavantî, the womb of the hidden sun. The anthill is

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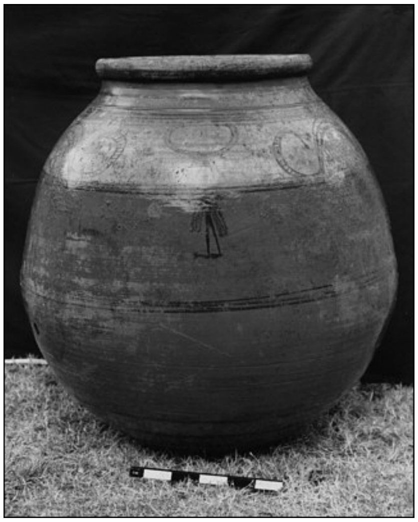
believed to contain treasure in the form of golden turmeric powder: the resonances with the Vedic Agni and Soma are unmistakeable.” Elizabeth Chalier-Visuvalingam, 2002, *Shiva and his Manifestations (Different Forms of Bhairava, Vîrabhadra, etc., as Folk Deities)*. Cf, Chalier-Visuvalingam, E., (1986). Bhairava: Kotwal of Varanasi, in T. P. Verma, D. P. Singh, and J. S. Mishra (eds.), *Varanasi Through The Ages*. Bharatiya Itihas Sankalan Samiti. Varanasi, pp. 231-260.

In Vajraya_na Buddhism, **Cakra Samvara** is compared with Bhairava who is worshipped in the circular Yogini_ temples of Orissa. (Vidya Deheja, 1986, *Yogini_ cult and temples: A tantric tradition*, New Delhi). It is unclear if Samvara is cognate with S’abara (cf. Sra <S’abara in Orissa) and with S’ambara as an enemy of Indra (*Maha_bha_rata*). (cf. Asko Parpola, 1993, *Bronze age Bactria and Indian Religion*, Studia Orientalia, 70: 81-87).

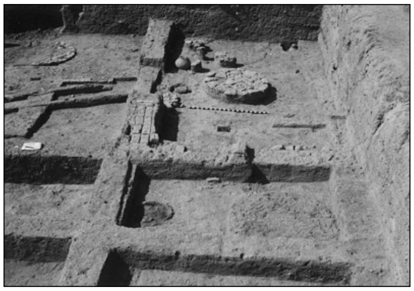
This tradition of Cakra Samvara may explain the finds during 2004 excavations, of circular platforms at Adi Badri, Yamunanagar, Haryana. Just as Bhairava is a ks.etrapa_la, Yaksha is a guardian deity of the earth and wealth of the earth; a guardian of treasures and waterholes or lakes, just as na_ga is a guardian of the underworld. Yaksha-s live in alaka_puri. Pandava-s came upon a lake that was guarded by a **Yaks.a**.

Harappa: reconstructed platform close-up (white colouring is caused by salt seepage) Signs 391-393 and 355 of the script are reminiscent of this circle-shaped platform. Workshop Platforms at Harappa are located both inside houses and in courtyards [**bat.e** = courtyard of a house (Santali.lex.)].

Part of the brick platform on which the original timber (?warehouse) of Mohenjo-daro once stood. The lower figures show how the commodities brought in from the river banks were hauled up on to the main loading platform; the other figure (top left) is crouching in the opening of one of the ventilation ducts.The heavily reinforced platform could have been used to store both ores and metal artefacts as well as fire-wood and charcoal needed for metal-working (cf. Fig. 51 in: Mortimer Wheeler, 1976, *My archaeological mission to India and Pakistan*, London, Thames and Hudson).



Padri: Storage Jar with painting of a horned head-dress: Mature Harappan Phase (c.2,500-2,000 B.C.) The majestic, curved horns of a buffalo, of the type shown on a seated person on a Mohenjodaro seal are painted on the jar.



Padri: Structure Complex: Rooms including a coppersmith's

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room with a circular platform,circular furnace and copper implements. Early Harappan Phase (c.3,000-2,600 BCE).

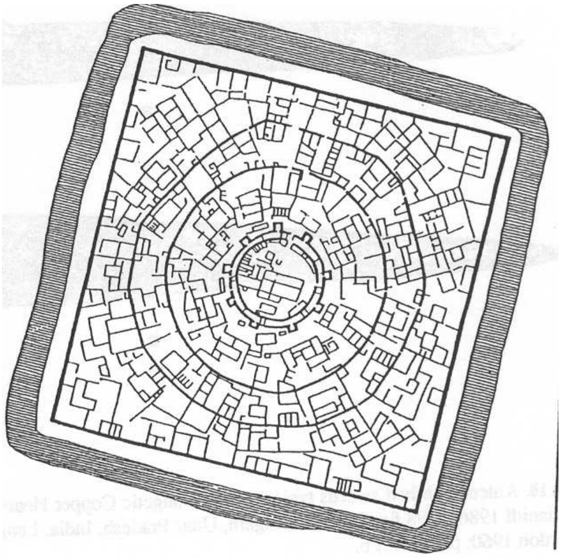
Yaks.a, Parkham, 200 B.C.

The glyphs of s'ankha and cakra not only adorn the hands of mu_rti-s of Vishnu in many temples all over Bharat but also have been inscribed on coins of kings of historical periods, attesting to a continuing historical tradition for over 8 millennia.

Coin issued by King Mahinda V of Sinhala, CE 956-972

Obverse: in bead circe, Elephant standing left, trunk pendent. Before legs, a symbol; over back a conch.

Reverse: In similar circle, horse prancing left, before it a brazier or a lamp, ligatured to a corn-stalk and over back, a cakra. Thus, the coin depicts two sacred symbols: s'ankha and cakra.



Groundplan of the temple-fort in Dashly-3, Bactria, ca. 2000 BCE (After Sarianidi, Viktor I., *Die Kunst des alten Afghanistan*. Leipzig. 1986: 59). Inside the square walls (150 m. wide) around the fort are buildings; three are circular buildings with concentric walls. Asko Parpola's surmise is that this so-called 'temple' corresponds to the Vedic description of the Da_sa or Asura forts (*tripura*). This surmise is not based on any textual evidence linking Asura to such circular structures.

The evidence of the man.d.ala-s in BMAC archaeological sites (forts of Kutlug-Tepe and At-Tchapar ca. 500 BCE of the Achaemenid period) and the man.d.ala created in a stu_pa with 24 spokes found at Sanghol, Punjab (Kushana period) point to the migrations of people away from the Sarasvati River basin during 2nd millennium BCE and during the historical periods. There is no archaeological evidence to assume that the man.d.ala of Gonur Tepe and other sites points to migrations of people from BMAC area into Bharat. The comparative analyses of Vedic and Avestan tradition clearly establishes the chronology: Vedic texts > Bra_hman.a-s > Avestan.

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Cylindrical stupa of the Kushana period found at Sanghol (Dist. Fatehgarhsahib

Punjab) with three concentric rings of rick masonry with intervening space divided by radiating spokes of similar brick masonry at regular nervals. At Sanghol site the core is made of a thick circular wall of brick masonry filled with earth. At Sanghol was discovered a carved lid of the relic casket with an inscription in Kharoshti script dated to circa 1st century BCE; the epigraph reads: **Upasakasa Ayabhadrasa**.

He is **man.ibhadra**, the protector of the beads and gems, exemplified by the cut **s'ankha** which adorns his left hand in the S'ivapuram sandstone sculpture. *Agni Purâna* (51, 17) describes S'iva as a Kshetrapâla. Bhairava is located in the northeast of the Hindu mandiram, the protector of the settlement, the **ks.etrapa_la.** He is the **kotwal** (guardian-magistrate) of Vis'vana_tha of Varan.a_si. Adored in 64 forms, in a manifestation of the formless divine parama_tman, in the Hindu (Kashmir S'aivism), Buddha and Jaina traditions, the central form is ma_rta_n.d.a-bhairava. Man.d.ala geometrical patterns of settlements are preserved in Newar, Nepal, as evidenced by Bhaktapur in Nepal. Consistent with *Agni Purâna* (52) Bhairava is presented in the center of a circle of Yogins has 12 arms corresponding to 12 Âdityas who preside over the twelve months of a year. In the Buddha tradition, **Maha_ka_la** is the **ka_la bhairava;** other forms are **Samvara** and **Heruka** (cf. the image of Ka_rttikeya in Swa_mimalai is called **E_raka Subrahman.ya**). In Nepal, he is also celebrated as La_t. Bhairava, connoting the la_t. or yu_pa, on the twelfth day of the kr.s.n.a paks.a in Bha_dra month, the same date on which *Indra dvaja* or *Indra Maha_* is celebrated. Another substitute form is Vi_rabadra. S'iva Pura_n.a describes Bhairava as transcendent (pu_rnaru_pa) complete form. He is called Bhairava because he protects (bharati), because he is effulgent terrifying (bha_). He is ka_la bhairava (the divinity of time). In the southern parts of Bharat, he is Khan.d.oba or Ma_rta_n.d.a Bhairava married to representatives of the settled agricultural-trading as well as vanava_si. Rudra of R.gveda is the predecessor form of Bhairava. He is presented in images of: brahmas'iras'chedaka (kapa_lin), kan:ka_lamu_rti and bhiks.a_t.anamu_rti. Stella Kramrisch notes eloquently, "No contradictions were adequate and no single iconographic likeness sufficed to render the total, tremendous mystery of Bhairava. The furthest outreach of contradictory qualities was gathered in the intensity of myth, and split in the variety of images in bronze and stone."

The tradition may indeed be a continuity of the use of circular platforms in Harappa.

Tradition of sindur adornment

Sindur worn in the parting of the hair. Nausharo: female figurine. Period 1B, 2800 – 2600 BCE. 11.6 x 30.9 cm.[After Fig. 2.19, Kenoyer, 1998].Hair is painted black and parted in the middle of the forehead, with

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traces of red pigment in the part.This form of ornamentation may be the origin of the later Hindu tradition where a married woman wears a streak of vermilion or powdered cinnabar (sindur) in the part of her hair. Choker and pendant necklace are also painted with red pigment, posssibly to represent carnelian beads.

Sindur on the parting of the hair in unique Bharatiya tradition, circa 4800 years Before Present The hair is painted black and parted in the middle of the forehead, with traces of redpigment in the parting. This form of ornamentation may be the origin of the later Hindu tradition where a married woman wears a streak of vermilion or powdered cinnabar (sindur) in the parting of her hair. The choker and pendant necklace are also painted with red pigmen, possibly representing carnelian beads. Other figurines of similar design have yellow pigment on the disc-shaped ornamens at the shoulde, possibly representing gold or polished bronze brooches. The eyes are puctated and the ornaments and hair are all appliqué. This figurine comes from Nausharo, Period IB, but is identical to many figurines from Mehergarh Period VII, datin between 2800 and 2600 BCE. Material: terracotta; 11.6 cm. high, 30.9 cm. wide. Nausharo NS 91.01.32.01. Dept. of Arch., Karachi. Jarrige 1988: 87, fig. 41 (After fig. 2.19, Kenoyer, 2000).

Transfer of rice-growing cultures from east to west, from Ganga valley to Baluchistan

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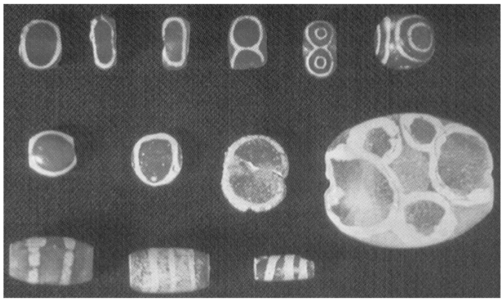
"The Ganges valley, where numerous points of bone and ivory that are similar to the Pirak ones were carved, is also one of the earliest rice-growing cultures." (Jarrige, Jean-Francois and Marielle Santoni, 1979, *Fouilles de Pirak*, I-II. Paris: I, 410). Around 2000 BCE, contacts between the mid-Ganga valley and borders of Baluchistan wers strengthened: "It is indeed at this period that we find evidence of the foundation in the northwest of the Ganges valley, near present-day Delhi, of a great many villages that were strongly influenced by Harappan culture." (Jarrige, Jean-Francois, 1985, The Indian world. In: *The World Atlas of Archaeology*: 238-247, London: 244).

Mohenjo-daro. Bronze figure wearing bangles, holding a small bowl in her right hand. Hair is tied in a horizontal bun hanging low on the back of the neck. Traces of long-almond-shaped eyes are visible. Bangles adorn the upper left arm and a few bangles are indicated above the right elbow. Bronze sculpture shows a high level of skill in modeling and lost-wax casting, a technology which continues to the present day throughout Bha_rata. [After Fig. 7.24 in JM Kenoyer, 1998].Bronze/copper. Mohenjo-daro. 13.cm. high; 4.7 cm. NMK 50.883; DK 12 728; Mackay, 1938: 274, pl. LXXIII.9-11. Cire perdue technique.

Pa_vai vil.akku: the bowl on the right hand of the statue may have been used as a lamp. Two views.

Mehrgarh. Terracotta figure, with elaborate coiffure and ornaments from Period VI at Mehrgarh (ca. 3000 BCE)

Mohenjodaro. Terracotta figurines. Two cups are on either side which might have been used as lamps. **A terracotta figurine shows how beads were worn. Mohenjodaro. Terracotta female adorned with six graduated strands of chokers and pendant-head necklaces.** A triple-strand belt supports a short skirt. A fan-shaped headdress adorns the braided hair, along with edges of what were once cup-shaped side-pieces (lamps to hold oil and cotton wicks). Karachi, National Museum NMP 50.509 Marshall 1931: 338, pl. XCIV.14



Harappa. Carnelian bead decorated with white, bleached elliptical design on both faces. H89-1484. Carnelian is a red stone made by heating an agate stone.

The finds of shell ornaments in Mehrgarh 300 kms. north of the Makran coast show the early exploitation of marine-based resources. At Mehergarh, the Chalcolithic period (Periods II and III, from around 5500 to 3300 BCE), records an increased use of steatite bead necklaces and bracelets, along with pendants of lapis lazuli, carnelian and other semiprecious stones. At Mehrgarh and Nausharo production began of blue-green glazed faience beads which required fairly high firing temperatures

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as well as a specialized technology of frit and glaze preparation (Barthélémy de Saizieu and Bouquillon 1997).

Veneration of ancestors

What Gaya on Ganga river is to pitr. s'ra_ddha, Pr.thudaka (Pehoa) on Sarasvati is to ma_tr s'ra_ddha. Hence, River Sarasvati is referred to as ma_tr.gaya in Bharatiya tradition.

At Pehoa-Prthu_daka-in Sarasvati Ghat and Brahma yoni near Vasis.t.a_s'ramam the river becomes pra_ci_va_hini_; sarasvati is so named in the revenue maps of Haryana and also in *Bha_rat Bhu_racana_*, Survey of India maps.) [cf. Prasher, R.N., The subterranean Sarasvati_, Haryana Sahitya Akademi, *Journal of Indological* Studies, Vol. III, Nos. 1-2, Spring 1988, pp. 301-305).

All along the pilgrimage route described in the Maha_bha_rata, Balarama offers homage to the ancestors and great r.s.is who are the builders of Bharat. Sarasvati is also called Bharati. The following quotes are from the Rigveda: Sarasvati_ is the first creation among rivers and joins the ocean, according to the Great Epic:

es.a_ sarasvati_ pun.ya_ nadi_na_muttama_ nadi_
prathama_ sarvasarita_m nadi_ sa_garaga_mini_ (*MBh. Anus'a_sana* 134.15)

Skanda Pura_n.a emphatically adds that the Sarasvati_ river carries the Vad.ava_nala fire to the ocean:

sama_hu_ya tato devi_m sva_m suta_m padmasambhavah
uva_ca putri gaccha tvam gr.hi_tva_gnim mahodadhim (*Skanda Pura_n.a, Prabha_sa Ka_n.d.a* 17.53, Venkateshwar Press edn.)

Padma Pura_n.a (S'r.s.t.i kha_n.d.a 18.198) states that the Sarasvati_ river vanished underground because she was made to carry the Vad.ava_nala fire. The reference is apparently to some large-scale tectonic disturbance which resulted in river piracy and river migrations involving the tributaries of the Sarasvati_ river. An intimation of this possible tectonic event is related in a legend in the Great Epic. Devas led by Brahma brought Ka_rttikeya to the Sarasvati_ river and made him the Commander of their army. With the s'akti given him by Agni, Ka_rttikeya broke asunder the kraun~ca mountain which sheltered the daitya Ba_n.a, son of Bali, who tormented the devas. That the kraun~ca mountain near Sarasvati_was rent asunder by fire is a significant reference to the tectonics of the Himalayan ranges and the foothills of the Siwalik mountain ranges.
There are 72 r.ca-s of R.gveda which adore Sarasvati; some examples:

7.002.08 May Bharati, associated with the Bharatis; Il.a_ with gods and men; and Agni and Sarasvati_ with the Sa_rasvatas; may the three goddesses sit down before us upon this sacred grass. [Il.a_ with gods and man: il.a_ devabhir manus.yebhir agnih; Il.a_ is associated with men; Agni is associated with the goddesses. This and the three following verses are repeated from the second as.t.aka].

7.009.05 Repair, Agni, to the presence of the gods in your office of messenger, (sent) by the assembly engaged in prayer; neglect us not; offer worship to Sarasvati, the Maruts, the As'vins, the waters, the universal gods, that they may bestow treasures (upon us).

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7.035.11 May the divine universal gods be (favourable) to our felicity; may Sarasvati_, with holy rites, be happiness; may those who assist at sacrifices, those who are liberal of gifts. Be (conducive to) our happiness; may celestial, terrestrial and aquatic things be (subservient to) our happiness.

7.036.06 May the seventh (stream), Sarasvati_, the mother of the Sindhu and those rivers that flow copious and fertilizing, bestowing abundance of food, and nourishing (the people) by their waters come at once together. [The mother of the Sindhu: sindhu ma_ta_ = apam ma_tr.bhu_ta_, being the mother of the waters].

7.036.07 May these joyous and swift-going Maruts protect our sacrifice and our offspring; let not the imperishable goddess of speech, deserting us, speak (kindly) to our (adversaries); and may both (she and the Marut) associated augment our riches. [Let not the imperishable goddess of speech: ma_ nah parikhyad aks.ara_ caranti = aks.ara_ vya_pta_ caranti va_gdevata_ asma_n parityaktva_ asma_d vyatirikta_ ma_ dra_ks.i_t, let not the diffusive deity of speech, having abandoned us, look upon our opponents].

The recent findings of Kenoyer and Meadow from Harappa push the civilization back to an early date of 3300 B.C.; this date is consistent with the date of recently discovered archaeological site in Kunal (near Kurukshetra). This is the clearest indication that the interaction networks of the early phases of the culture, were gravitating from the hundreds of sites on the Sarasvati river basin, using Harappa and Mohenjodaro as trading outposts and using the copper ore from the Khetri mines in Rajasthan, accessible through Kantali river which was a tributary of the Sarasvati river.

The veneration for the departed a_tman, of *pitr.,* is an integral feature of the cultural traditions of Bha_rata. The R.gveda is replete with the adoration of **pitr.**

Veneration of departed a_tman of ancestors is an ancient cultural practice, details of which have been reconstructed by archaeologists from sites all over Bharat and in particular from the sites which evolved on the banks of Rivers Sarasvati and Sindhu.

The veneration of the departed a_tman is matched by the veneration of fire or fire-worship expounded in many r.ca-s of the R.gveda, invoking Agni. The finds of ‘fire-altars’ at Lothal and Kalibangan may be related to the two phenomena: 1. fire-worship; and 2. use of fire and bones in metallurgical processes in the early phases of evolution of science and technology in Sarasvati Sindhu Valley Civilization.

“The earlier burials in this cemetery (Cemetery H) were laid out much like Harappan coffin burials, but in the later burials, adults were cremated and the bones placed in large urns (164). The change in burial customs represents a major shift in religion and can also be correlated to important changes in economic and political organization. Cemetery H pottery and related ceramics have been found throughout northern Pakistan, even as far north as Swat, where they mix with distinctive local traditions. In the east, numerous sites in the Ganga-Yamuna Doab provide evidence for the gradual expansion of settlements into this heavily forested region. One impetus for this expansion may have been the increasing use of rice and other summer (kharif) crops that could be grown using monsoon stimulated rains. Until late in the Harappan Period (after 2200 BC) the agricultural foundation of the Harappan cities was largely winter (rabi) crops that included wheat and barley. Although the Cemetery H culture encompassed a relatively large area, the trade connections with the western highlands began to break down as did the trade with the coast. Lapis lazuli and turquoise beads are

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rarely found in the settlements, and marine shell for ornaments and ritual objects gradually disappeared. On the other hand the technology of faience manufacture becomes more refined, possibly in order to compensate for the lack of raw materials such as shell, faience and possibly even carnelian." [Kenoyer, www.harappa.com, Slide 162]

In addition to the peacock, dotted circles, fish, zebu (bra_hman.i bull) and elk (antelope or large stag) are also depicted on funerary pottery of the Harappan civilization. Glyphs depicting *taberna montana* flower-buds are ligatured on the wide horns of the antelope.

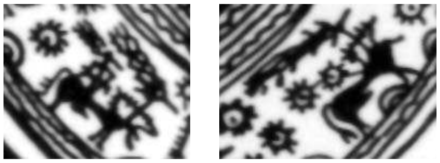
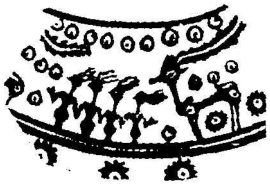


Figure of a person combining a bull's body, antelope horns and a human head and torso, with hands resting on the hips and arms covered with bangles. Cemetery H pottery motifs from Harappa, after Vats 1940, Pl. LXII. 'Although the style of these motifs is unique, the use of the trefoil and papal leaf headdresses along with horned figures strongly argues for the incorporation of some Indus beliefs with the new rituals." (Kenoyer, 1998, p. 175).

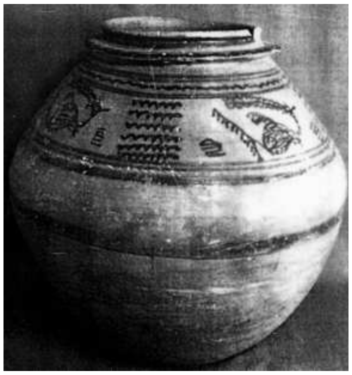
Small painted globular jar associated with cremation urns, ca. 1700 BCE, Cemetery H and painted dih or lid from the early levels of cemetery H, Harapa, ca. 1900 BCE.

Figure of a person is ligatured within the body of the peacock with a wavy plume (first peacock on the right); The person shown within the circle is probably the depiction of the departed a_tman, who has, after cremation, become an ancestor. The stylized depiction of the arms is paralleled by the stylized depiction of arms (or horns?) of the copper anthropomorphs found in Copper Hoard Culture.



Painting on burial jar. Cemetery H. Harappa. The bull is ligatured to a person with wavy hair (analogous to the wavy patten of the crest of the peacock], an apparent orthographic depiction of the departed soul. [After Pl. LXII, 13 in MS Vats, Excavations at Harappa].

Harappa. Large cremation urn from the later levels of Cemetery H. ca. 1700 BCE.



These images are evoked by the following lexemes of Bharatiya languages:

maryaka = the bull separated from the cows (RV 5.2.5)
mergo = with horns twisted back; rimless vessels (shaped like 'U') (Santali.lex.)
maruka, maru_ka = peacock, deer, antelope (Skt.); martu marak = the peahen (Santali.lex.)

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Blackbuck antelope: *marag* = horn; *mara* = dead; *sma_raka* = remembrance
murum = a Nilgae buck (Santali.lex.) **maru** = a deer, antelope (Skt.lex.)

Tulu: mair, Ma. Ta.: mayil (Tamil: payilpu_n~co_lai mayiler..unta_lavum-- Pur_na_. 116); Tamil: mayilam, mayir_pi_li = peacock feather; mayilai = fish; ash colour, grey.

J.Bloch saw the older lexeme to be Dravidian (BSL 76,16); J. Przyluski saw it as Austro-as. (BSL 79,100); Morgensteierne noted Savara **ma_ra_** = peacock; HW Bailey (BSOAS xx 59, IL 21,18) noted a link with Khot. mura_sa as orig. 'Indo-ir. colour word'... [loc. cit. CDIAL 9865]. **pincar marak** = peacock; matu marak = peahen; marak rak = peacock crow; marak t.ikli = the disc on the tail feathers of the peacock; korkot. marak = common peafowl. CDIAL 9865 notes: OAw. mam.ju_ra, mora; Nepali. mujur; Pkt. mau_la, mau_ra; Pali. mo_ra

Homonyms are:

ma~r.i~ = a corpse, a dead body; ma~r.i~ morda = a corpse (Santali) **mr.ta** = dead , deceased , deathlike , torpid , rigid (RV.) maran.am = death (Skt.)

maran: buru = the great or chief Spirit; **mar.an:** = before, first, in time or place; **maran:** = great, large, to become great, large, big, huge; first born, principal, head, chief.

maren = old, applied only to animate objects; maren hor kanae = he is an old man; ka~r.i = a corpse, a dead body; ma~r.i murda = a corpse (Santali.lex.)

Peacock and heaven (marak = peacock; **merxa_** = sky, heaven ?may the soul go to heaven); Parji. **marp- (mart-)=** to lighten; Kurux. **merxa_** = sky, heaven; Malto. **mergu** = sky, heaven; see Te. **mer_umu** = flash of lightning.

The deceased spirit has become the Ancestor! Pitr.!

Why was the peacock chosen? A possible interpretation may also provide a clue to the language of the civilization. These imagery are assumed to be logographs. Thus, ancient forms of lexemes describing these imagery and corresponding homonyms (i.e. similar sounding words) are likely to provide leads to unravel further, the language of the civilization. (*marak* = peacock; *sma_raka* = remembrance; ji_van-ji_vaka = cry of the peacock, peacock; living, the dead goes with life)

It would, therefore, appear that the image of a peacock connotes the resolve of the descendants of a dead person wishing that the soul of the departed may ascend to heaven.

Table at p. 247 of *Excavations at Harappa* by Madho Sarup Vats, 1974, Varanasi, Bhartiya Publishing House, lists many instances of burial pottery from Cemetery H, decorated with peacocks. Similar peacock designs on burial pottery have been found at many other Harappan or Sarasvati Sindhu civilization sites. New discoveries at Harappa have been reported by Kenoyer and Meadow in February 1999.

"Late Harappan Period large burial urn with ledged rim for holding a bowl-shaped lid. The painted panel around the shoulder of the vessel depicts flying peacocks with sun or star motifs and wavy lines that may represent water. Cemetery H period, after 1900 BC. These new pottery styles seem to

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have been introduced at the very end of the Harappan Period. The transitional phase (Period 4) at Harappa has begun to yield richly diverse material remains suggesting a period of considerable dynamism as socio-cultural traditions became realigned. "

In Pali (Rhys Davids' lexicon), **ji_van-ji_vaka** (poss. onomatopoetic) means a bird, a sort of pheasant which utters a note sounding like **ji_van ji_va** (Di_gha III.201)... Also cited is a Jain phrase: **ji_vanji_ven.a gacchai ji_vanji_venan cit.t.hai** [Weber Bhagavati_ pp. 289,290 with doubtful interpretation "living he goes with life"? or "he goes like the *ji_van-ji_vaka* bird"?]

Peacock as a *va_hana* of Godess Sarasvati, the association is apt; Sarasvati river is revered as pitr.pita_mahi_ and ancestral worship continues even today in many ghats along the Sarasvati River, e.g. (1) Balarama's pilgrimage along the Sarasvati River, described in the s'alya parva of the Great Epic, *Maha_bha_rata*; (2) Pehoa (or Pr.thu_daka) **near** Kurukshetra, where a Vasis.t.a_s'ram and Sarasvati ghats are revered by a million pilgrims who take a bath in the Brahma sarovar and offer pitr. tarpan.a (homage to ancestors) at the ghats, which are more ancient than the ghats in Va_ran.a_si on the river Gan:ga.

Peacock becomes the *va_hana* also of Ka_rtikeya, celebrated in the region in later historical periods. Balarama offers homage to the ancestors in his pilgrimage along the Sarasvati river (cf. s'alya parva, MBh); there are many ghats along the river near Pehoa, Kuruks.etra where the tradition is for pilgrims to offer *tarpan.a* to the ris.is and during auspicious events such as a solar eclipse...

Ka_rtikeya is a warlord and nurtured by the divine ancestor mothers; this is why is the peacock associated with him.

The peacock on the burial pottery on the Sarasvati and Sindhu river basins is, therfore, perhaps a representation of the lexemes:

ji_van-ji_vaka which may also be interpreted as a message to the departed soul: May he live as he goes with life...

A note on ligaturing as an artistic tradition

Ligatured sculpture: tiger, bull (or buffalo) and elephant. Nausharo. NS 92.02.70.04. 6.76 cm. High. Dept. of Archaeology, Karachi. EBK 7712. C. Jarrige, 1982: 132-5. “Hollow three-headed animal figurine. This complex figurine depicts a **tiger** with bared teeth, a **bull** or buffalo head with punctuated hair spots on the forehead, and possibly an **elephant** with multiple lines outlining the eyes. The tiger’s face is finely modeled, but the other animals’ features are less refined. This is the second such object found at Nausharo, and although comparable figurines have not been reported from other sites, multiple-headed animals are depicted on seals. Nausharo. Period III, Harappan 2300-2200 BCE.” [JM Kenoyer, 1998, p. 219].

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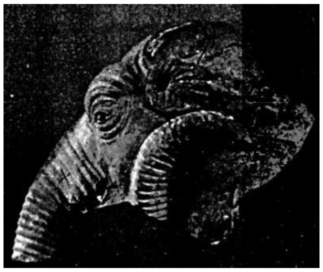
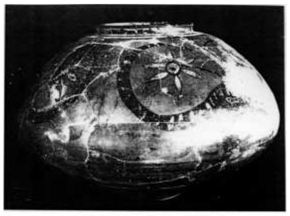
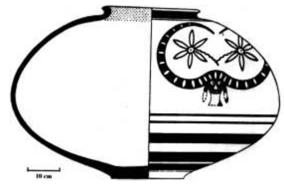


Ligatured statuette: elephant, buffalo and feline. Nausharo. NS 91.02.32.01.LXXXII. C. Jarrige, 1992: 132-5. "Hollow three-headed animal figurine. The most complete figure is of an **elephant** with a hollow trunk. Two horns of a water **buffalo** curve along the cheeks of the elephant, and the bottom jaw of a **feline** with bared teeth appears at the back of the elephant's head. This complex figure is finely modeled and incised with delicate strokes to portray the character of the elephant. Such multiple-headed animals are depicted on seals and must represent important myths. This object may have been used as a puppet or sacred figure in a cult ritual. Ca. 2300-2200 BCE." (JM Kenoyer, 1998, p. 219).





Kot Diji. Bovine (buffalo) depicted with long horns has a human face. Harappan period. Islamabad Museum. [Photo and drawing after Dept. of Archaeology and Museums, Govt. of Pakistan]. **ko_la** = woman (Nahali**); ko_l.** = planet (Ta.) Rebus: kol 'metal' (Ta.) **kod.u** = horn. Rebus: **kod.** = artisan's workshop (Kuwi)

Three-headed S'iva. Gandhara. 2nd cent. Grey schist 18.6 X 10.5 cm. (MIK I 5888).

The multi-headed sculpture of S'iva is a remarkable evidence of the continuity of the 'ligaturing' traditon evident in the inscriptions of the civilization (with three-headed animals, 'fabulous' animal and so on). In this sculpture of S'iva, the head is ligatured with: a human face, a lion's head and an antelope's head. Cf. Doris Meth Srinivasan, 1997, *Many heads, arms and eyes: origin, meaning and form of multiplicity in Indian art*, Leiden, Brill. "Originally the figure had four arms; now only two remain. He holds the trident (tris'u_la) in the right hand, and a small receptacle (kaman.d.alu) containing the elixir of life (amr.ta) or holy water in his left. The long hair is piled high on the top of the head in the ascetic style with the help of a hair-band (kes'abandha) and is stylized in the shape of flames. In the centre of the forehead, is a horizontal third eye...The figure wears no ornaments apart from the sacred threwad (upavi_ta) which passes from the left shoulder across the naked torso, and a piece of cloth draped over the left upper arm. The figure is clothed only in a striped (tiger-skin) loin-cloth out of which protrudes an erect phallus... The very complex iconography of S'iva, which is difficult to interpret, is further complicated by two animal heads emerging literally from behind his human head. The head on the right is that of a lion while the other seems to be of an antelope. According to Lobo, the heads of animals are meant to portray S'iva as the lord of animals, Pas'upati (Palast der Goetter 1992: 176), whether, this is indeed so remains an open question..." (Raffael Dedo Gadebuch, Exhibit 19 in: Saryu Doshi, ed., 1998, *Treasures of Indian Art: Germany's tribute to India's cultural heritage*, Delhi, National Museum, p.29).

If the ligatured heads and conical cap are heiroglyphic, they may connote **aru** 'lion' (Akkadian); rebus: **ara** = copper; **mr..eka** 'goat' (Te.); rebus: **mleccha mukha** = ingot of copper (Skt.); **mu~ha** = quantity of iron produced at one time in a native smelting furnace (Santali) **cu_d.e** = face (Ka.);

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s'u_la = trident (Skt.); **culha** = furnace, fireplace (Santali.) **kulla** = cap (Ta.) **kol** = alloy of five metals (Ta.)

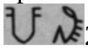
mu~h metal ingot (Santali) **mu~ha~** = the quantity of iron produced at one time in a native smelting furnace of the Kolhes; iron produced by the Kolhes and formed like a four-cornered piece a little pointed at each end; **mu_ha_ me~r.he~t** = iron smelted by the Kolhes and formed into an equilateral lump a little pointed at each end; **kolhe tehen me~r.he~tko mu_ha_ akata** = the Kolhes have to-day produced pig iron (Santali.lex.)

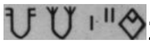
muh face (Skt.) **mu~he~** = face (Santali); **mu~h** (H.); **mu_ha_ mu_hi_** adj. adv. face to face, facing one another (Santali.lex.Bodding) Rebus: **mleccha-mukha** = copper (Skt.) mlekh = goat (Br.); mr..eka = goat (Te.)

sodo [Persian. **soda_,** dealing] trade; traffic; merchandise; marketing; a bargain; the purchase or sale of goods; buying and selling; mercantile dealings (G.lex.) **sodagor** = a merchant, trader; soda_gor (P.B.) (Santali.lex.) sadgal = a moneylender (Santali.lex.) **soda_gar** [Persian. fr. sodo + gar = Skt. kar, a doer fr. kr. to do] a merchant who deals in valuable things, or with large sums; **soda_giri** = dealing in valuable things or with large sums; adj. Mercantile, commercial (G.) **sod.ra** = a rolled up document, authority (Santali.lex.)[Note: use of cylinder seals to roll up and authenticate a transaction document on clay].

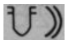
sodo bodo, sodro bodro adj. adv. rough, hairy, shoggy, hirsute, uneven; **sodgo** =adj. shaggy, having a large beard (Santali.lex.Bodding) **sodo bodgo** = hairy, hirsute, rough (Santali.lex.) [Note the bristly hair on the face]. Sadga badga = rough, surface uneven (Santali.lex.) **sodro** = a beard, a man with a beard (Santali) **sodro** = adj. bearded, large and rough (beard)(Santali)

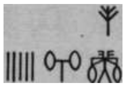
A human face with beard, is ligatured to orthographically represent a composite animal:

m0301  2258

m1177  2450 Composite animal: human face, zebu's horns, elephant tusks and trunk, ram's forepart, unicorn's trunk and feet, tiger's hindpart and hooded serpent-ligatured as a tail.

Kalibangan035 [Notes. (1) the bearded face ligatured to composite animal and to markhor; (2) many animals shown face to face].

m1179  2606 Human-faced markhor with long wavy horns, with neck-bands and a short tail.

m1180a .  1303 Human-faced markhor [Note the twisted horns:

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Mleccha language and Sarasvati Heiroglyphs: Mlecchita Vikalpa, writing system

Talking through the footsteps of time

The principle used for cracking the code of the heiroglyphs is simple: the glyphs can be read in bharatiya languages with corresponding homonyms denoting metal workers' repertoire.

What would Jamshedji Tata do when asked to inscribe his calling card stating his profession or in general, what he does for a living ? [Tata is a Parsi who set up the Tata Iron and Steel Works in Jamshedpur using the iron ore of Bengal-Bihar Jharia mines. Hence, the city is named after him.]

He will take a steel plate and inscribe thereon: Artisan of steel blast furnace.

The hypothesis of this inquiry is that artisans of Sarasvati civilization inscribed on copper plates and other media their versions of blast furnaces, an astonishing array of them, working with an array of mineral ores and rare-earths, rare of those times, ca. 8500 years Before Present.

Bronze foot and bronze anklet: Mohenjo-daro [After fig. 5.11 in: DP Agrawal, 2000].

Surely, the furnaces of circa 5000 years Before Present brought about a veritable technological revolution in Bharatiya society, exemplified by the bronze anklet shown a bronze foot made by a vis'vakarma mleccha. The s'ankha industry dates back to circa 8500 years Before Present.

Krishna blowing the Panchajanya s'ankha, Kurukshetra war

The sound of panchajanya s'ankha is symbolic of the sounds of the language spoken by the five peoples of Bharat. This language can be unraveled using the epigraphs of the Bharatiya civilization.

Bhima killed 'As'vattha_ma', the elephant. Dron.a was struck with grief. Drona asked Yudhisthira if that was true. Yudhisthira said, Ashvatthama is killed; "elephant, not the man" he added in a low voice and the last phrase was not heard, was lost in the loud *om-ka_ra* (sound of *om*) generated by the blowing of the conch of Krishna, Panchajanya.

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Panchajanya lit. means 'of the five people', i.e. of all the five peoples, all the Bha_ratiya-s who lived in a civilization area of 1.25 million sq. kms. covering the regions of present-day Afghanistan, Pakistan and north-west Bharat. This shows the importance of s'ankha industry in the Sarasvati Civilization. This also shows that the s'ankha was an industry in which all the peoples of Bharat were engaged. The five people are referred to as Bha_ratam Janam by Vis'vamitra Gathina in the Rigveda.

Speculating on Rigveda as evidence for evolution of languages of Bharat

From the viewpoint of language studies, Rigveda is an allegory, abounding in metaphors. The challenge is to understand the reality from the metaphors.

Take for example, one of the 11, 000 r.ca-s:

sa tritasya_dhi sa_navi pavama_no arocayat
ja_mibhih su_ryam saha

9.037.04 The pure Soma upon the high place (of the sacrifice) of Trita, attended by its kindred rays, has lighted up the Sun.

Potable gold: 'golden fleece' and replicating age-old processes in a Gold Museum

Could these be the words of an ancestor of the metal-workers and lapidaries of Sarasvati civilization? Is soma material? Is the high place the pinnacle of a constructed furnace? Who is Trita? Is some furnace work in process as observed and recorded by the kavi, the r.s.i of this r.ca? There are some indications that pavama_na mentioned in the r.ca is a reference to flowing soma. At the present state of knowledge, we just do not know anything else about the metaphor used to convey something effulgent, something more effulgent than the surya and hence could light up surya with its kindred rays (arocayat ja_mibhih). We are also assuming in this semantic exercise that the meanings of the words were understood as we seem to understand them based on lexical entries. At the present state of knowledge, it will be honest to admit that we just do not know and we are groping. The fidelity of this samhita_ is well established by the oral tradition which is preserved and nurtured even today. So, surely, there is evidence which can be perceived in the samhita_ to get derive truth from facts of Bharatiya cultural evolution and roots.

RV 10.127.01 The divine Night approaching looked upon many places with her eyes, she has assumed all beauties. [This su_kta is recited at the sacrifice offered in the early morning by one who has had unplesant dreams during the night].

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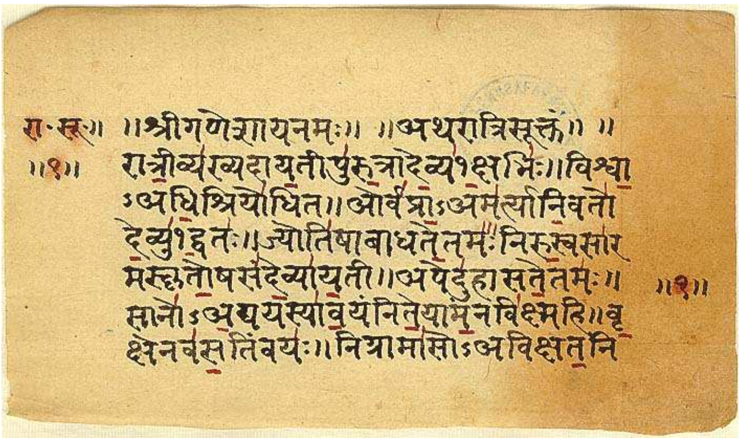
Similarly, methods available to philologists are inadequate to date this document in the chronology of language evolution within Bharat, assuming that there is general agreement that the locus of the r.ca-s are northwest Bharat, principally on the banks of River Sarasvati. So was the locus the banks of this river for Veda Vyasa who is the author of the Mahabharata.

EW Hopkins (1896, Praga_thika_ni, I, *JAOS*, 17: 23-92) presented a list of words which occur in the 8th book and not elsewhere in the R.gveda; he noted that the differences are not just lexical, but include cultural and geographic backround and proper names (pp. 84-8). Ka_n.va hymns refer to sheep, agriculture, ploughing and the 8th book has many word with retroflex consonants. Decdendant of Yadu (ya_dva) is mentioned in RV 7.19.8.



R.gveda Manuscript RV 10.127 ra_trisu_kta (University of Pennsylvania)

Georges-Jean Pinault (1998, Le nom indo-iranien de l'hote, in *Meid*, 1998: 451-77: 453-5) provides the parallels between the Ka_n.va hymns and Mitanni proper names (ca. 1500 to 130 BCE): five proper names end in –atithi 'guest': Medhya_tithi, Medha_tithi, Ni_pa_tithi, Mitra_tithi and Deva_tithi. These names parallel the Mitanni bahuvri_hi proper names ending in –att(h)I 'having X as his guest': Biriatti/Priya_tt(h)i-/, Mittaratti/Mitra_tt(h)i-/, As'urattiAsura_tt(h)i-/, Mariatti/Marya_tt(h)i-/, S'uriatti/Su_rya_tt(h)i-/, Intaratti/Indra_tt(h)i-/, Paratti/Pra_tt(h)i-/ and S'u_atti/Suvatt(h)i-/. Pinault goes on to determine the early semantic of **atithi**: 'who stays nearby, who is placed next to (the house of the host)'.

Surely, the Mitanni was **nearby** Bharat, the region of Bharata-s! And, there is no reason to postulate an Iranian locus for Ka_n.va. In a dialectical continuum, the Old Indo-Aryan (ancestral to Epic and Classical Sanskrit) was intelligible to Old Vedic. [See Asko Parpola, 2002, Pre-Proto-Iranians of Afghanist an as initiators of s'a_kta tantrism: on the Scythian/saka affiliation of the da_sas, Nuristanis and Magadhans, *Iranica Antiqua*, Vol. XXXVII, ed. DT Potts, GENT]

The traditions associated with R.gveda pre-date the Sarasvati civilization exemplified by over 2,000 archaeological sites on the banks of the River Sarasvati.

Veda is a word derived from the root *vid* 'to know'. In the Bharatiya tradition, Sarasvati is associated with knowledge, and with arts and crafts. On the banks of river Sarasvati arose what is perhaps the world's first human document, the R.gveda.

R.k means 'mantra'. The contemporaneous traditions of *yajus*. '*yajn~a'*, *sa_man* 'song', *atharvan* 'fire', *dhanus* 'bow', *s'ilpa* 'sculpture' and *a_yus*. 'life' are documented respectively in: *Yajurveda, Sa_maveda, Atharvan.aveda, Dhanurveda , S'ilpaveda and A_yurveda.*

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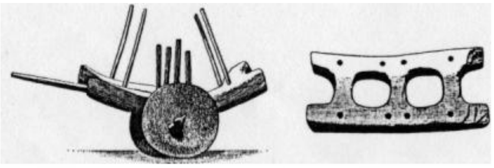
Two metaphors

R.gveda is riddled with metaphors. According to Yaska, even the divinities are metaphors.

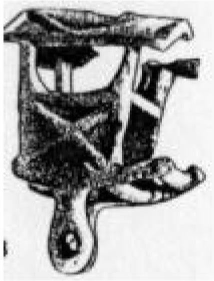
Two recurrent metaphors relate to: **soma** and **ratha**.

Apart from the boats plying on the River Sindhu which are comparable to the boat depicted on a seal of the civilization, the toy cart models unearthed during excavations are not unlike the carts in use even today in Sindh province. Clay model of a cart (pole, posts and axle reconstructed), with a top view of the chassis, Chanhudaro, Sarasvati-Sindhu valley, ca. 2,000 BCE. The axle turns with the solid, non-spoked wheels.



Copper model of a passenger box on a cart, Chanhudaro, ca. 2,000 BCE.

This Chanhudaro passenger box finds a remarkable parallel in the **copper model of a chariot** with four onagers found at Tell Agrab, Mesopotamia (See below: the X-shaped re-inforcement on the box).



“Recent excavations at Banawali in Harayana have brought to light a very good terracotta model of a ploughshare. It consists of a curved beam and a sharp-ended ‘shoe’ (Bisht, 1987: Pl. 26). More or less similar ploughshares are still in use, not only in Haryana but also in the …neighbouring areas.

“A terracotta model of an axe fitted to a handle found at Mohenjodar (Mackay, 1938, Vol. II, Pl. CXII,1) reminds one of the use of similar axes even nowadays in the countryside for cutting fire-wood for cooking purposes as also for felling trees in the jungle. Similar to what are in use today are fish-hooks found at almost all Harappan sites (for example, Marshall, 1931: Vol. III, Pl. CXLIII, 24-25).

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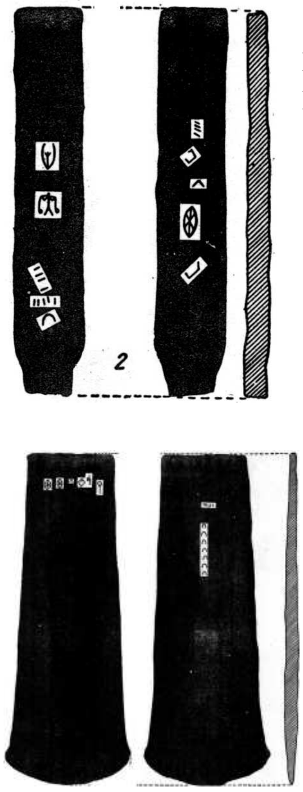
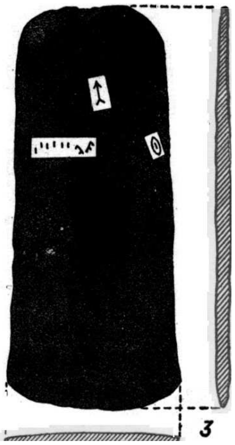
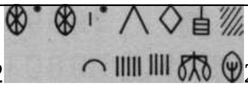
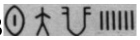
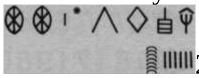




Mackay cxxvi2  2923
Mackay xvi3  2924 Mackay cxxvi5
 2925
Mackay cxxvii1 [Four slanted strokes; 7 short numeral strokes]

[See: J.S. Pettersson, 1999, Indus Numerals on Metal tools, in: *Indian Journal of History of Science*, 34(2), pp. 89-108. "By internal evidence, then number of times a numeral can occur in sequence appears to be bound by eight. That is, if the different numerals together formed a system, as supposed here, that system was octal…it demolishes the hypothesis that the numerals represent weight units, at least the common units described by Hemmy (1938)."

as.t.aman:galaka ha_ra

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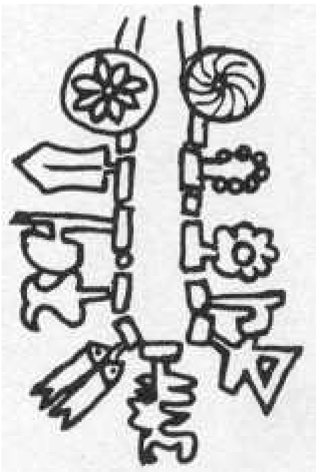

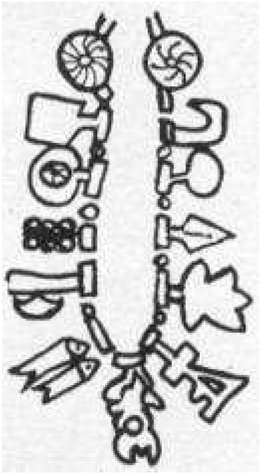

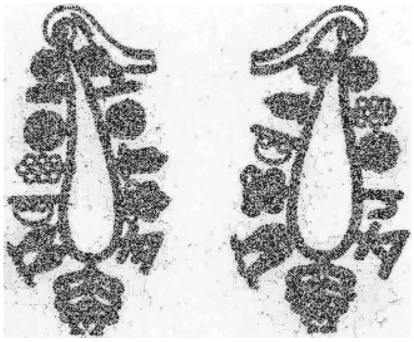

Necklaces with a number of pendants Man:galaka ha_ra depicted on a pillar of a gateway (toran.a) at the stu_pa of Sa_n~ci, Central India, 1st century BCE. [After VS Agrawala, 1969, *The deeds of Harsha (being a cultural study of Ba_n.a's Harshacharita*, ed. By PK Agrawala, Varanasi: fig. 62] The ha_ra or necklace shows a pair of fish signs together with a number of motifs indicating weapons (cakra, paras'u, an:kus'a), including a device that parallels the standard device normally shown in many inscribed objects of SSVC in front of the one-horned bull.

(cf. Marshall, J. and Foucher, *The Monuments of Sanchi*, 3 vols., Callcutta, 1936, repr. 1982, pl. 27). The first necklace has eleven and the second one has thirteen pendants (cf. V.S. Agrawala, 1977, *Bha_rati_ya Kala_*, Varanasi, p. 169); he notes the eleven pendants as: sun, s'ukra, padmasara, an:kus'a, vaijayanti, pan:kaja, mi_na-mithuna, s'ri_vatsa, paras'u, darpan.a and kamala. "The axe (paras'u) and an:kus'a pendants are common at sites of north India and some of their finest specimens from Kausambi are in the collection of Dr. MC Dikshit of Nagpur." (Dhavalikar, M.K., 1965, *Sa_n~ci: A cultural Study*, Poona, p. 44; loc.cit. Dr.Mohini Verma, 1989, *Dress and Ornaments in Ancient India: The Maurya and S'un:ga Periods*, Varanasi, Indological Book House, p. 125).

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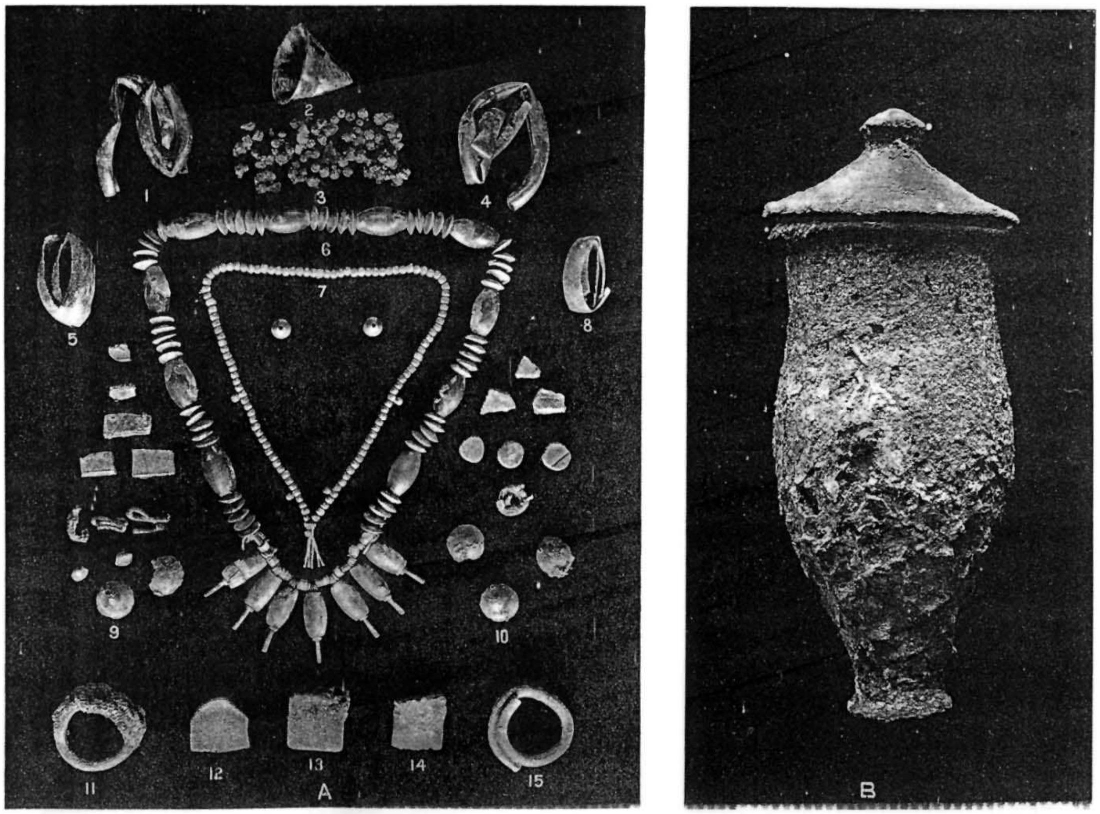
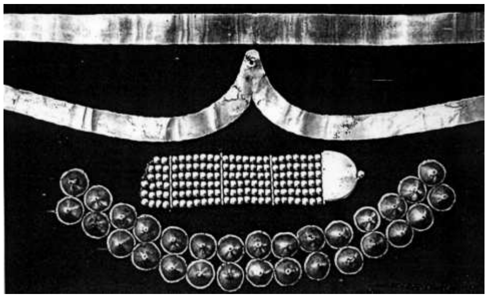


MIC, Pl. CXLVIII. Gold jewellery and silver vase.
Harapa. Terracotta figure; necklaces adorn the figure. [After Fig. 7.23 in JM Kenoyer, 1998].



Straight and curved gold fillets; beaded choker; thirty hollow cap-shaped gold ornaments with tiny hoops on the inside of the tip. [After Fig. 7.38 in JM Kenoyer, 1998]. Fifty-four smaller gold caps were found in a hoard at Harappa that may have been sewn onto clothing or a belt; one bearded male terracotta figure is shown wearing a skirt or wide belt covered with conical projections which may be this type of gold caps. MIC, Pl. CXLIX. Jewellery.

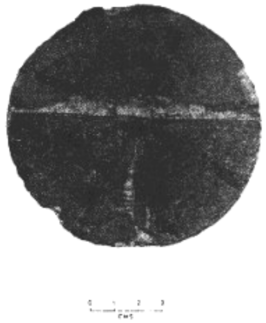


Fig. 9.2 : Terracotta spoked wheel from Kuntasi.

A reference to itinerant metal-smiths who make arrows of metal, in the Rigveda (9.112.2) will have to be re-evaluated in the

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context of this evidence.

jarati_bhih os.adhi_bhih parn.ebhih s'akuna_na_m
ka_rma_ro as'mabhih dyubhih hiran.yavantam icchati_ (RV. 9.112.2)

This is a description of a smithy, perhaps an allusion to the making of copper reducing the ores. The metalsmiths sold the products (a copper implement or copper-tipped arrow or golden ornament) to moneyed-people.

Connected to the processing of soma is namuci.

The r.ca 5.30.9 refers to the two women, who are made into Namuci's weapons; namuci is ‘white lead’, a mineral.

5.030.09 The slave (Namuci) made women his weapons what will his female hosts do unto me? The two his best beloved, (Indra) confined in the inner apartments, and then went forth to combat against the Dasyus. [What will his female hosts do unto me? Indra is supposed to say this; the two his best beloved: decapitation of Namuci by Indra is related in the gada_ section of the S'alya parva of the Maha_bha_rata; Namuci through fear of Indra, took refuge in the solar rays; Indra promised that he would not harm him if he came forth, but broke his promise, and, on Namuci's issuing forth, cut off his head; by this he incurred the guilt of brahmanicide, for, Namuci was a brahman, but Indra was taught expiation of his sin by Brahma_].

["That the name contains a negative is assumed by Pa_n.ini (VI.3.75)...According to Halevy, Consider. crit., p.38, Namuci = Namik = Namitch, the form which the Turkish immigrants gave to Nami (= Ranha_)." (Hillebrandt, opcit., note 318, p. 359)].

Like Namuci, Vr.tra is an ominous figure who has withheld the 'waters' from the world and is engaged in a series of 'battles' with Indra who is called Veretraghna in Avesta; the imageries generated in the r.cas is the success achieved by Indra in finding a path-way for the waters by removing the obstruction or hindrance, which is personified by Vr.tra as well as Vala. Vr.tra as enveloper of the 'waters' is called the paridhi, the enclosure of the rivers (RV3.33.6).

Namuci possesses Soma (VS XX.59). Da_sa or Dasyu Namuci is mentioned in RV 6.20.6 and RV 5.30.3. Namuci is an asura in RV 10.131.4. ["The meaning of 'demons' is generally on the increase in the tenth book, hence, it is closer to the period of the Bra_hman.as. The hymns which refer to the Asuras in hostile sense provide thus a criterions to say that they belong to the Bra_hman.a-stratum, or, to put it more cautiously, to the groups whose notions were continued in the Bra_hman.as" Hillebrandt, opcit., note 83, p. 424, vol.II].

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Arsenic was alloyed with copper to create hardened metal tools and weapons; an alloy which represents an early 'bronze'.

da_rumuca = white arsenic (Skt.lex.) Therefore, na-muci may be a negative formed to pinpoint a mineral substance, i.e. 'non-arsenic'; the reference of Namuci may be to 'white lead' in this semantic derivation, consistent with the association of Namuci with 'lead, plumbum' in the R.gvedic and later mythology. [cf.namak = salt (Pahlavi.Hindi); sindhu-lavan.a = rock salt (Skt.)]

Like Soma, Varun.a is purchased (S'S'S) for sahasren.a gava_m, thousand bulls/cows.
TS VI.1.11.1 notes: va_run.o vai kri_tah soma upanaddha; and TS VI.1.11.5,6 adds: varun.o va_ es.a yajama_nam abhyati yat kri_tah soma upanaddhah. S'Br. III.3.4.25 cites a customs invoked in the Su_tras: sa yad a_ha varun.asya skambhasarjani_ stha iti varun.yo hy es.a etarhi_ bhavati yat somah kri_tah.(cf. MS III.7.8). The recurring theme is: kri_tah somah, the 'purchased Soma'.

The invoking of Varun.a is related to the release of the fetters of Varun.a: MS I.10.10 (150.10): yad varun.apragha_sair yajeta sarvya_mhaso ves.t.yai. (cf. S'Br. II.5.2.4: varun.apa_s'a_t pramun~cati ta_ asya_nami_va_ akilbis.a_h praja_h praja_yante tasma_d va_ es.a etais' caturthe ma_si yajate; A_pS'S VIII.7.26 states: 'they step on the edge of the water with the formula, 'Varun.a's fetter is trampled'.)

Soma is a metaphor denoting metallurgical processing and purification of electrum. **Ratha** is a metaphor of time, governed by the motion of celestial bodies; it is also a metaphor for a celestial vehicle, denoting the process of carrying the electrum ores into the fire-altar, the **vedi** to achieve the timely fulfillment of the desire to acquire **amr.tam**, immortality.

Of the ten man.d.ala-s of R.gveda, an entire man.d.ala, the eighth, is devoted to processing **soma**. **Soma** is the only commodity the processing of which is elaborated in great detail in the R.gveda. The entire Sa_maveda is devoted to **Soma**. An understanding of the metaphor of *soma* is central to the understanding of the Vedic tradition in Bharat and later in the Avestan tradition of *haoma*. The Avestan *haoma* is cognate with Vedic *homa*, a process of working with fire-altar or *vedi*.

While it is clear that R.gveda and other texts in the Vedic tradition – the *Veda-s, Upanis.ad-s, Bra_hman.a-s, A_ran.yaka-s, Su_tra-s, Itiha_sa* in *Ra_ma_yan.a* and *Maha_bha_rata* and the *Pura_n.a-s* – are a very complex set of documents which can be studied at different levels of knowledge: cosmic-spiritual, temporal and material levels, an attempt will be made in this work to understand the processing of **soma** in the context of later-day technological traditions which evolved on the banks of River Sarasvati and neighbouring regions.

A tradition evolved in Bharat treating many metal objects and weapons as *pavitram*, auspicious or sacred. The word, *pavitram* has a special significance in R.gveda in the context of soma processing. *Pavitram* connotes a ‘filter’ to purify the ‘artifacts’ brought out of the *vedi* or fire-altar after the yajn~a.

Apa_m phena as a weapon

RV 8.14.13 mentions apa_m phena; this is described as a weapon which Indra hurls at Namuci. The Bra_hman.a tradition has a legend: Indra drinks sura_ at Namuci's residence and falls ill. Indra is then cured by Sarasvati_. The Sautra_man.i_ is performed for a person from whose nose, ears etc.

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Soma flows out. 'Soma flows out, the so-called somapu_ta, further for a brahmin who desires success, for an exiled king, for a ks.atriya and so on, and is performed in a typical fashion...Further we find Namuci's name in a formula; during the consecration ceremony of the king, uttering this formula, kicks with his foot a piece of lead that has been kept on the tiger skin. (nirastam namuceh s'irah: TS 1.8.14; TBr 1.7.8.2; S'Br 5.4.1.9; MS 4.4.4 (54.5)...The comm. on TS says: **lohita_yasam ta_mram pu_rvam phenena pa_titam yan namuceh s'iras tad idam ta_mraru_pam san nirastam parityaktam**)...In the Va_japeya and here in the Sautra_man.i_ the Parisrut is bought against lead from a long-haired man...Indra makes a compact with Namuci...It is the well known compact (MS 4.3.4 (43.7)(cf. MBh 9.43.34) not to injure Namuci either with a dry object or with a wet one, either in daylight or at night...Indra breaks the oath and kills this opponent apa_m phenena...I would think that the apa_m phena should be understood in the sense of some solid material and that it denotes some substance like, e.g. lead, because this very metal serves, as we saw, as the purchasing price in the sura_ ceremonies. In the context of removing the old fire, Kaus'ika Su_tra LXXI.15 states that one should place si_sa_ni in the hands of the eldest son, and the commentary explains this word as si_sam nadi_phenam lohamr.ttika_. Kaus'ika Su_tra VIII.18 lists **si_sa, nadi_si_sa** (comm. **nadi_phenapin.d.a**), **ayorajas, kr.kala_sas'irah** among the things called 'lead', but not among the immediately following rasas (like **dadhi** and **ghr.ta**)." [Alfred Hillebrandt, 1927, *Vedische Mythologi*e, tr. Sreeramula Rajeswara Sarma, 1980, *Vedic Mythology*, 2 vols. Delhi, Motilal Banarsidass, vol. II, pp. 148-149].

Trita, soma-presser

Vedic Trita and Avestan Tritha are Soma pressers. Bhr.gus arise from the flames of Praja_pati's seed; An:giras arise from the coals and Trita has his origin in the waters. In such an interpretation, Trita may be seen as the name of an ancestor (like Kutsa or Kan.va).

The r.cas 8.047.13 to 18 explain how Trita A_ptya takes the sin and evil effects upon himself. Avesta notes a thrita, while the R.V mentions trita and dvita. ["...Iranian Thrita, who is regarded as a healer and who received a thousand healing plants from Ahuramazda...Trita...its connection with the Old IRisih triath, 'ocean' (Fick, VWB 4th edn., I, p. 63; Johansson, IF, IV, p. 143) appears as uncertain as the derivation from tri, 'three'." Hillebrandt, vol.2, p. 195, n. 631). Macdonell explains Trita as god of lightning. (Macdonell, Mythological studies in the R.gveda, JRAS, 1893, XXV, pp. 419-96). Trita is attributed with the name a_ptya (Note the concordance with Yas.t A_twya; cf. Bartholomae, IF, I, p. 180; Johansson, *Bidrag till Rigtvedas Tolkning*, p.7). At the command of Indra, Trita kills Tvas.t.r's son and drives out the cows. (cf. RV 2.11.19): In the Rigveda, the lexeme taks.am is used to define composition or fashioning. apu_rvya_ purustamanyasmai mahe vi_ra_ya tavase tura_ya; virips'ane vajrin.e s'antama_ni vaca_msya_sa_ sthavira_ya taks.am (RV. VI.32.1): a seer has composed unprecedented, comprehensive and gratifying praises for the mighty Indra. agnaye brahma r.bhavastataks.uh (RV. X.80.7):the fashioning of hymns for agni is done by the r.bhus. Avestan tradition, Ahur Mazda_ is conceived as a carpenter who fashions the earth from wood and who fashions bodies and souls: ga_us'-tas'a_: da_idi mo_i ya_ gam ta'so_ apas ca urvaras ca: 'grant me thou -- who has created Mother Earth and the waters and the plants' (Yasna 51.7); hyat na_ mazda_, paourvi_m ga_eoasca tas'o_ dae_nasca_: 'since for us, O Mazda, from the beginning Thou didst create Bodies and also Souls' (Yasna 31.11)(The Divine Songs of Zarathushtra, pp. 682-3, pp. 210-1). gaus = ga_v (Skt. gau). The phrase mahigauh in RV refers to the earth.

The sememe taks. refers to the technical skill of fashioning metallic objects. r.bhus do great deeds and have dexterous hands (svapasah suhasta_h) and frame a chariot for the as'wins (RV.1.111.1;

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X.39.4), fashion the vigorous horses for Indra (RV. 1.20.2; 1.111.1; III.60.2) and divide the single camasa into four (RV. I.161.2). The r.bhus fabricate the ratha (chariot)(RV. 1.111.1; IV.33.8), fashion agni for manu's sacrifice: dya_tva_ yamagnim pr.thive_ janis.t.a_ma_pastvas.t.a_ mr.gavo yam sahobhih, i_d.enyam prathamam ma_taris'va_ deva_stataks.urmanave yajatram (RV. X.46.) ye as'vina_ ye pirata_ ya u_ti_ dhenum tataks.urr.bhavo ye as'va_; ye amsatra_ ya r.dhagrodasi_ ye vibhvo narah svapatya_ni cakruh (RV. IV.34.9): r.bhus fashioned the chariots for as'vins, renovated their parents, restored the cow, fabricated the horses, made armor (am.satra) for the gods, separated earth and heaven and accomplished the acts of good results. Sa_yan.a explains the equivalence of tvaks. and taks. in re: RV. I.100.15: taks.u_ tvaks.u_ tanu_karan.e (to accomplish by reducing, scraping, cutting) in the context of the skills of carpentry, using tools. Taks.a is a professional like the bhis.ak (physician) and priest (Brahman): taks.a_ ris.t.am rutam bhis.agabrahma_ sunvantamicchati_ndra_yendo pari srava (RV. IX.112.1) The major wood-work included cutting of the sacrificial stake (yu_pa), fastening of the wooden ring (cas.a_la) on its top and fashioning of the wooden vessels: yu_pa vraska_ uta ye yu_pava_ha_s'cas.a_lam ye as'vayu_pa_ya taks.ati; ye ca_rvate pacanam sambharantyuto tes.a_mabhigu_rtirna invatu (RV. I.62.6) Tvas.t.r. carved the vajra, the weapon wielded by Indra to severe the limbs of vr.ttra (RV. 1.32.2; 52.7; 61.6; 121.3; X.48.3; 99.1); it is a_yasam (metallic)(RV. X.48.3) atha tvas.t.a_ te maha ugra vajram sahasrabhr.s.t.im vavr.tacchata_s'rim nika_mamaraman.asam yena navantamahi sam pin.agr.ji_s.in (RV. VI.17.10): fierce Indra, Tvas.t.r. constructed for thee, the mighty one, the thousand-edged, the hundred-angled thunderbolt, wherewith thou hast crushed the ambitious audacious loud-shouting ahi = vr.ttra. RV. I.85.9: tvas.t.a_ yadvajram sukr.tam hiran.yayam sahasrabhr.s.t.am svapa_ avartayat: refers to the shaping of the thunderbolt, vajra, by skilful (svapa_ = s'obhanakarma_); Sa_yan.a explains sukr.tam as samyak nis.pa_ditam or well made; hiran.yayam as suvarnamayam or golden; sahasrabhr.s.t.im as aneka_bhir dha_ra_bhir yuktam or 'of numerous edges'. Tvas.t.r. augments the strength of Indra by fashioning a vajra of overpowering vigour: tvas.t.a_ citte yujyam va_vr.dhe s'avastataks.a vajramabhibh_tyojasam (RV. I.52.7)

The transition from the lithic age to the bronze age is apparent from the description of adze or va_s'i as either metallic or made of stone and used for shaping wooden vessels: va_s'i_bhih as'manmayi_bhih (RV. X.101.10) Rigveda refers to smelter of metals (dhma_ta_: RV. V.9.5) and the smith (karma_ra: RV.X.72.2)[Schrader notes that the names of smiths in IE languages are often derived from the old Indo-Germanic names for stone of which the smiths' tools were originally made; e.g. hamarr (OHG); akmo_n (= anvil)(Gk.); as'man (=hammer, anvil, oven)(Skt.)

Tvas.t.r. is shown sharpening his metallic axe while fabricating the camasa bowl used for soma (apparently, the axe is used to fashion the bowl): s'isi_te nu_nam paras'um sva_yasam (RV. X.53.9) The camasa created by Tvas.t.r. is later divided into four parts by his disciples, the r.bhus: uta tyam camasam navam tvas.t.urdevasya nis.kr.tam (RV. I.20.6); akarta caturah punah (RV. IV.33.5-6)[Commenting on RV. I.20.6, Sa_yan.a says that r.bhus are the disciples of Tvas.t.r.: tvas.t.uh s'is.ya_r.bhavah. Elsewhere, Sa_yan.a refers to Tvas.t.r. as the preceptor of the r.bhus: r.havah tvas.t.a_ yus.madguruh (RV. IV. 33.5)]

The reference to ratha is: ratham suvr.tam (RV. 1.111.1). Sa_yan.a interprets this as well-built or good-wheeled: s'obhanavartanam sucakram va_ The carpenters' tools are: svadhiti which is used to cut and trim the wooden post: ya_nvo naro devayanto nimimyurvanaspate sva_dhitirva_ tataks.a (RV. III.8.6) va_s'i_ and paras'u are also creations of divine artificers: tvas.t.r. and r.bhus (RV. I.110.5; X.53.9-10) Vis.n.u prepares the womb and Tvas.t.r. adorns the forms: vis.nuryonim kalpayatu tvas.t.a_ ru_pa_n.i pim.s'atu (RV. X.184.1) svadhiti is used to create a well-made form

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(tvas.t.reva ru_pam sukr.tam svadhityaina_:AV. XII.3.33) Atharva Veda refers to the use of va_s'i_ by taks.an: yat tva_ s'ikvah para_vadi_t taks.a_ hastena va_sya_ (AV.X.6.3) RV I.32.5 alludes that Indra strikes Vr.ttra with vajra, as the kulis'a (=axe) fells a tree-trunk: ahanvr.tramk vr.trataram vyamsamindro vajren.a mahata_ vadhena; skandha_msi_va kulis'ena_ vivr.kn.a_ hih s'yata upapr.kpr.thivya_h. A cognate Indian lexeme is: kulha_d.i_ (a metallic blade with a cutting edge and a handle). r.bhu, vibhu, va_ja constitute a trinity; the r.bhus are saudhanvana_h (sons of Sudhanvan). The r.bhus are mortals who attained immortality by dint of their workmanship: marta_sah santo amr.tatvama_nas'uh (RV. I.110.4) Commenting on RV. I. 20.1, Sa_yan.a observes that r.bhus were pious men who through penance obtained deification: manus.yah santastapasa_ devatvam pra_ptah. Aitareya Bra_hman.a describes them as men who by austerity (tapas) obtained a right to partake of soma among gods (AB. III.30.2) ya_bhih s'aci_bhis'camasa_m apis'ata yaya_ dhiya_ ga_marin.i_ta carman.ah; yena hari_ manasa_ nirataks.ata tena devatvamr.bhavah sama_nas'a (RV. III.60.2): With those faculties by which you have fashioned the drinking bowl; with what intelligence wherewith you have covered the (dead) cow with skin, -- with what will by which you have fabricated two horses (of Indra); with those (means) r.bhus, you have attained divinity. Macdonell derives the term r.bhu from the root rabh, to grasp and explains it as handy or dexterous and identifies it with German elbe and English elf. (opcit., p. 133)

tvas.t.r., soma

Tvas.t.r. is the master of all forms and shaper of all animals (tvas.t.a_ ru_pa_n.i hi prabhuh pas'u_nvis'va_ntsama_naje)(RV I.188.9) He is the fashioner of the quick-moving horse: tvas.t.urva_ja_yata a_s'uras'vah (TS. V.I.11.3; KS. XLVI.2) The lexeme also means a fashioner or artificer (A.A.Macdonell, Vedic Mythology, p.117) Indra drinks soma in the house of Tvas.t.r. : tvas.t.ugr.hi apibat somamindrah (RV. IV.18.3) Tvas.t.r. is referred to as supa_n.im, beautiful-handed; sugabhastim beautiful armed and r.bhvam shining or glorious (RV. VI.49.9) sukr.tsupa_n.ih svavau r.ta_va_ devastva.s.t.a_vase ta_ni no dha_t (RV. III.54.12): May the divine Tvas.t.r., the able artificer, the dexterous handed, the possessor of wealth, the observer of truth,bestow upon us those things (which are necessary) for our preservation. ugrastura_va_lamibhu_tyoja_yatha_vas'am tanvamcakra evah; tvas.t.a_ramindro janus.a_bhibhu_ya_manus.ya_ somamapibaccamu_s.u (RV. III.48.4): fierce, rapid in assault, of overpowering strength, he made his form obedient to his will; having overcome Tvas.t.r by his innate (vigour), and carried off the soma, he drank it (or deposited) in the ladles. These and other references lead Macdonell to surmise that Indra's father whom he slays in order to obtain the soma, is Tvas.t.r. (opcit., p. 57) [cf. Chaturvedi, P.S., 1969, *Technology in Vedic Literature*, Delhi, Books and Books].

On the banks of River Sarasvati, R.gvedic people were engaged in processing **soma**. An entire book is devoted to this ‘early chemical’ or ‘alchemical’ process, elaborated through a series of complex metaphors.

r.s.ibhih sambhr.tam rasam (RV 9.67.31): 'liquefied (Soma) or essence of (Veda)' collected by the sages: [see use of -bhr.ta in: s'ulvabhr.ta, that is his purificatory spit-bath'; bhr.ta in sam.bhr.ta = one whose body is well-nourished or fed (TBr.); the usage in metallurgy is in reference to the accumulation of requisite materials]

RV 10.85.3-4 **[somam manyate papiva_n yat sampim.s.anty os.adhim somam yam brahma_n.o vidurna tasya_s'na_ti kas'cana** RV 10.85.3 (AV 14.1.3): he thinks that he has drunk Soma when

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they grind the herbs together; of the soma which the Bra_hman.as know, none whatsoever partakes**]** distinguishes between the Soma that the priests know and that which they process.

Niruktam 11.4 explains the r.ca-s: 'The hemistich, 'because they grind the herbs together,one thinks that he has drunk the soma', refers to the uselessly-pressed soma, which is not soma at all. Of the soma which the Bra_hman.as know, none whatsoever,i.e. no one who doesnot offer sacrifice, can partake. This is with reference to sacrifice. Now with reference to the deity. The hemistich,'because they grind the herbs together, one thinks that he has drunk the soma', refers to the soma pressed with the Yajus formula, which is not soma at all. Of the soma which the Bra_hman.as know, i.e. the moon, none whatsoever, i.e. no one who is not a god, can partake.'

Thus, the haoma (or soma) processed in the Avestan tradition is not soma at all; it is a useless herbal substitute. Niruktam 11.4 explains that soma is a metaphor and equates it to the moon.

It will be hypothesized and further elaborated that soma which the early *r.s.i-s* and *kavi-s* (smiths) of the R.gveda knew was electrum – gold-silver compound ore.

The real soma is wealth: RV 9.86.45 **agrego ra_ja_pyas tavis.yate vima_no ahna_m bhuvanes.v arpitah harir ghr.tasnuh sudr.s'iko arn.avah jyoti_rathah pavate ra_ya okyah**, 'walking in the forefront, the king of the waters becomes strong; as the one who regulates the days, he is installed in the worlds. Golden, butter-backed, beautiful to look at, billowing, riding on a chariot of light, the friend of the house purifies himself to become the wealth for us.' RV 9.106.9: **a_ nah suta_sa indavah puna_na_ dha_vata_ rayim vr.s.t.i_dya_vo ri_tya_pah svarvidah**, 'O pressed drops, wash forth riches to us, purifying yourself. Let the sky rain, let the waters flow. You find the light.'

If soma/haoma is a derived noun from the verb root su-/sau- (hu-/hau-), 'to press or extract (essence from something), Soma/Haoma cannot be the name of a plant, but only the extract derived from the yajn~a, a process of pressing or liquefaction.

It is a tough philological task indeed to differentiate between the metaphor or allegory, and the process of 'purifying' terrestrial and celestial Soma in the R.gveda.(RV 10.116.3: mamattu tva_ divya_h soma indra mamattu yah su_yate pa_thives.u, 'let the celestial Soma intoxicate you, Indra, let that intoxicate you which men press').

Nature and Functions (karma) of 'deities'

The allegorical nature of the Vedic literature becomes apparent when we define the nature and functions of 'deities' extolled through hymns and offered Soma. Soma is not food for mortals but is food for the divinities.

Cha_ndogya Upanis.ad (5.10.4): **es.a somo ra_ja_. tad deva_na_m annam.tam deva_ bhaks.yanti** (Soma is king, Soma is food for the divinities; divinities eat Soma).

tisra eva devata_ itinairukta_h; agnih pr.thivi_stha_nah; va_yuvendro va_ntariks.astha_nah; su_ryo dyustha_nah; ta_sa_m ma_habha_gya_dekaikasya_ api bahu_ni na_madheya_ni bhavanti; api va_ karma pr.thaktva_t; yatha_ hota_dhvaryurbrahmodga_tetyapyekasya satah; api va_ pr.thageva syuh; pr.thugdhi stutayo bhavanti...atha_ka_ra cintanam devata_na_m; purus.avidha_h syurityekam; cetana_vadvaddhi stutayo bhavanti;

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tatha_bhidha_na_ni; atha_pi paurus.avidhikairan:gaih samstu_yante...yatho etaccetana_vadvaddhi stutayo bhavanti_tyacetana_nyapyevamstu_yante; yatha_ks.aprabhr.ti_nyos.adhiparyhanta_ni.

"There are three deities only", say the etymologists: (1) Agni, whose sphere is earth; (2) Va_yu or Indra, whose sphere is atmosphere; (3) the sun, whose sphere is heaven. Of these, each receives many appellations on account of his supereminence, or the diversity of his function, just as a priest, although he is one, is called the sacrificer (hotr.), the director of the sacrifice (adhvaryu), the possessorof the sacred lore (brahma)), and the chanter (udga_tr.). Or else they may be distinct, for their panegyrics as as well as their appellations are distinct...Now (we shall discuss) the appearance of the gods. Some say that they are anthropomorphic,for their panegyrics as well as their appellations are like those of sentient beings. Moreover they are praised with reference to anthropomorphic limbs...As to the view that their panegyrics are like those of sentient beings, (we reply) that inanimate objects,beginning from dice and ending with herbs, arelikewise praised.' (Niruktam 7.5, 6,7)

It is a metallurgical allegory; Soma is extracted out of the bronze fortress, a fortification of heaven, by the eagle which tore it quickly from the heaven: RV 8.100.8 manojava_ ayamanah a_yasi_m atarat puram divam suparn.o gatva_ya somam vajrin.a abharat; RV 1.93.6: Ma_taris'van fetched one of you (Agni and Soma) from heaven; the eagle twirled the other (Soma) from the cloud-rock. [Note the mountain-dwelling (giris.t.ha_ RV3.48.2; 5.43.4; 9.18.1; 62.4), mountain-grown (parvata_vr.dh RV 9.46.1) Soma, connected with the rock (adri RV 5.85.2; 1.93.6].

Soma is a liquid manifestation of the celestial fire (Hertel, *Die Arische Feuer-Lehre*). RV 9.54.2: ayam su_rya ivopadr.g ayam sara_m.si dha_vati sapta_ parvata a_ divam, 'in appearance like the sun, he runs through the lakes, the seven streams and heaven'. RV 9.54.3: ayam vis'va_ni tis.t.hati puna_no bhuvanopari somo devo na su_ryah, 'Soma stands,purifying himself, above all the worlds,like the god Su_rya'.

Mleccha

A synonym for vedic **namuci** is mleccha **takaram** ‘white lead’ (Ta.) Nagari in devana_gari (i.e. Samskr.tam) can be derived from Nahali mleccha.

Soma: a_tma_ yajn~asya

This pithy R.gvedic statement means that soma is the very soul of yajn~a, that is, the key purpose of performing the yajn~a is to process soma.

A synonym in mleccha for soma is hom, somnakay (Gypsy). This has a homonym, homa ‘bison’ and hence can be represented connoted through another metaphor, a Sarasvati hieroglyph.

All Sarasvati hieroglyphs are metaphors; metaphors for sound and for meaning through glyphs and underlying substantive message.

The underlying language, **mleccha** resulting in the **mlecchita vikalpa**, cipher writing (of epigraphs of the civilization) yields a paradigm-shift in our understanding of the early languages of Bharat. During the days of the civilization, i.e. between 3300 BCE (emergence of Harappa) and 1500 BCE (submergence of Dwaraka) within the Sarasvati drainage basin of north-west Bharat, there was a

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linguistic area, a dialectical continuum which ranged from Nahali of Tapati River basin to Maithili of Ganga basin, from Tamil of Tamraparn.i river basin to Santali of Mahanadi basin, from Kashmiri of Ravi River to Sindhi of River Sindhu basin. The thousands of lexemes of all Bharatiya languages provide the basis for reconstructing the gloss of this dialectical continuum, this linguistic area, unraveling the glyphs used on epigraphs as rebus lexemes. The Egyptian heiroglyphs were glyptic representation of syllables, the Sarasvati heiroglyphs were glyptic representation of both phonetics and semantics of lexemes.

RV 1.108.6: **yad abravam prathamam va_m vr.n.a_no ayam somo asurair no vihavyah,**

'As I said when choosing you at first, we must fight the Asuras for this Soma'.

According to S'Br. 3.2.1.23 ff., the Asuras cry out during their flight *he'lavo, he'lavo*; this is the same as *he'rayah*, 'oh! the enemies!' See Muir, OST, 2nd ed., II, p. 114; Kuhn, Beitra_ge z. P. Gr., p. 43; Davidson, ZDMG, XXXVII, p. 23; Eggeling, SBE, XXVI, p. 31, n.3) This means that Asuras spoke an Indian dialect. [halla_ = tumult, noise (P.Ku.N.B.Or.H.); halphal = shaking, undulation (CDIAL 14017). helao = to move, drive in (Santali). e_le_lo = a word which occurs often in sons sung by boatmen, e_lappa_t.t.u (Ta.). The mlecchas who shout 'helavo, he lavo' were sea-farers using tossing boats. S.C. Roy (The Asuras -- ancient and modern, Journal of the Bihar and Orissa Research Society, 12, 1926, 147) notes a Mun.d.a tradition that India was previously occupied by a metal-using people called Asuras. The asuric or creative capabilities of the people leads to a description of the River Sarasvati_ as a_suri_ in the R.gveda.

In phonology, the Avesta agrees with the Sanskrit in its vowels in general. Skt. dipthong e_ appears in Avesta as ae_, o_i,e_. Skt. o_ appears as Av.ao, eu. Avesta inserts epenthetic vowels: i,e, u (Av. bavaiti = Skt. bhavati; Av. haurva = Skt. sarva). In R.gveda 9.101.3 we come across the phrase duros.am...somam, which may be compared with the corresponding Avesta phrase haomem du_raos.em,meaing: Haoma, which keeps death afar or Haoma of far-spreading radiance... (M.F. Kanga and N.S. Sontakke, eds., 1962, *Avesta_, Part I: Yasna and Vi_sparat*, Pune, Vaidika Sams'odhana Mand.a.la). The Vedic hapax os.am 'quickly' may be from older 'burning'; hence duros.a can mean, 'hard to burn', a context which fits the interpretation of soma as electrum subjected to a process of cementation and smelting.

Like the people of the Sarasvati-Sindhu civilization who were fire- and metal-workers, some people of the Rigvedic culture were fire-workers par excellence. Gold (**hiran.yapin.d.a_n, hiran.yayuh**) was highly valued (cf. RV. vi.47.23, vii.78.9). Divoda_sa gave golden treasures to the r.s.i Garga. Rigveda refers to nis.kagri_va (RV. v.19.3) which is a golden ornament on the neck and necklaces of gold reaching down to the chest.hiran.ya (pl.) means gold ornaments (RV. 1.122.2). Gold was smelted from the ores (PB, xviii.6.4, JB I,10) which evoke the Indian alchemical tradition enshrined in the soma rasa, later elaborated as the science of alchemy: rasa-va_da. In Tamil soma-man.al means, sand containing silver ore. In Egyptian, assem means electrum; in Gypsy, **somnakay** means gold. Gold was won from the river-beds: Sindhu is called the hiran.mayi_ (RV. x.75.8); Sarasvati_ is called hiran.yavartani_ (AV. vi.61.7). [cf. the reference to vasati_vari waters in vedic hymns related to soma, an apparent reference to panned-gold from the Sarasvati_ river-bed.]

"From Vedic Index: ayas. The exact metal denoted by this word when used by itself, as always in the R.gveda (RV i.57.3; 163.9; iv.2.17; vi.3.5), is uncertain. As favouring the sense of 'bronze' rather than that of 'iron' may perhaps be cited with Zimmer(*Altindisches Leben*, 52) the fact that

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Agni is called ayo-dam.s.t.ra,'with teeth of ayas' (RV i.88.5; x.87.2), with reference to colour of his flames, and that the car-seat of Mitra and Varun.a is called ayah-sthu_n.a (RVv.62.8), 'with pillars of ayas' at the setting of the sun (note: in the same verse, it is said to be of golden appearance at the flush of dawn). Moreover, in the Va_jasneyi Sam.hita_ (xviii.13), ayas is enumerated in a list of six metals: gold (hiran.ya), ayas, s'ya_ma, loha, lead (si_sa), tin (trapu).Here s'ya_ma ('swarthy') and loha ('red') must mean 'iron' and 'copper' respectively; ayas would therefore seem to mean 'bronze'. In many passages in the Atharveda (xi.3.1.7; Maitra_yan.i_ Sam.hita_ iv.2.9) and other books, the ayas is divided into two species--the s'ya_ma ('iron') and the lohita ('copper' or 'bronze'). In the S'atapatha Bra_hman.a (v.4.1.2)a distinction is drawn between ayas and loha_yasa, which may either be a distinction between iron and copper as understood by Eggeling (*Sacred Books of the East*, 41.90), or between copper and bronze as held by Schrader (*Prehistoric Antiquities*, 189). In one passage of the Atharvaveda (v.28.1), the sense of iron seems certain. Possibly, too, the arrow of the R.gveda (vi.75.15), which had a tip of ayas (yasya_ ayo mukham), was pointed with iron.

The importance of Gujarat in unravelling the linguistic area of Bha_rata is stated in the following terms by Colin P. Masica: "...the entire Indo-Aryan realm (except for Sinhalese) constitutes one enormous dialectical continuum...The speech of each village differs slightly from the next, without loss of mutual intelligibility, all the way from Assam to Afghanistan....Mitanni kingdom... Indo-Iranians appear in northern Syria a full half millennium before their appearance in western Iran. How did they get there?...To call these Mitanni kings 'Indo-Iranians', however, is to beg an important question...Some have held that these linguistic fragments are specifically Indo-Aryan. Others including Burrow (1955) held they represent undifferentiated Indo-Iranian, before the split between Iranian and Indo Aryan...An Indo-Aryan identification would demand an earlier dating of the Iranian/Indo-Aryan split; with it have also been associated speculations regarding the route taken by the Aryans to India (e.g., the Asia Minor route...), or, possibly a back migration of Aryans from India. (If the latter, the date of the Aryan settlement of India would have to be moved back far enough to allow not only for them to reach Syria by 1500 BC, but also for their language to have died out by then, leaving only the terminological residue noted...)...the philological evidence alone does not allow an Indian origin of the Aryans...there is the matter of the nature of the common vocabulary shared by Sanskrit with the rest of Indo-European, which points to a more northerly ultimate home...**The native Dravidian vocabulary has not been reconstructed. Burrow and Emeneau's Dravidian Etymological Dictionary (1960) only assembles materials for it...** The civilization seems to have continued peacefully in Gujarat until a comparatively late period, i.e. 800 BC (Fairservis 1975: 307), after which it dissolved into the subsequent culture, which makes that area one of prime importance in detecting any Harappan influence on Aryan language and culture." (Colin P. Masica, *The Indo-Aryan Languages*, Cambridge, Cambridge University Press, 1991).

Let us look at the evidence of agricultural terms in the languages of the region, terms for agricultural implements, cultivation of the soil, and food items.

"In 1936 Wilhelm Brandenstein concluded from the fact that the Indo-Iranian branch had not taken part in common PIE semantic developments in the field of agricultural terminology that the Indo-Iranians must have lost contact with the main body of PIE speakers at a time when agriculture had not yet developed among them. When the Aryans entered Indoa, accordingly, they would still have been pastoral nomads. Nowadays, however, the lexical difference is explained by the 'polycentric origin of the IE agricultural knowledge from two or three earlier food producing centres by cultural – and partly also by lexical – differences' (Makkay, J., 1988, Cultural groups of SE-Europe in the Neolithic: the PIE homeland problem and the origins of the Proto-greeks, *AION*, 10, p. 125; see also Masica, C.P., 1979, Aryan and non-Aryan elements in North Indian agriculture, in: M.M. Deshpande and PE Hook, eds., *Aryan and Non-Aryan in India*, Ann arbor, p. 57). The process of borrowing has continued over the centuries. In modern Hindi 80 percent of the terminology is, as Masica's fundamental study has made clear, of foreign origin: 'The surprising thing is that only a small proportion of the remainder is either Dravidian or Austroasiatic, even by generous estimates' (1979: 131). See also Schlerath, B., 1989, Viehzuchtertum and Ackerbau, *GGA* 241, 41 ff." (Kuiper, FBJ, 1991, *Aryans in the Rigveda*, Amsterdam, Rodopi, p. 15).

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Kuiper cites from Southworth the following examples of glosses, testifying to a ‘strong foreign impact’: *ku_t.a*, ‘house’; *kun.d.a*, ‘pot, vessel’; *u_rdara*, ‘a measure for holding grain’; *apu_pa*, ‘cake’; *odana*, ‘rice dish’; *karambha*, ‘a kind of gruel’; *pin.d.a*, ‘a lump of flesh’; *ulu_khala*, ‘mortar’; *ka_rotara*, ‘sieve, drainer’; *camris.*, ‘ladle’; *kos’a*, ‘cask, bucket’; *kr.s’ana*, ‘pearl’; *ki_na_s’a, ki_na_ra*, ‘ploughman’; *khilya*, ‘waste piece of land’; *la_n:gala*, ‘plough’; *si_ra*, ‘plough’; *pha_la*, ‘ploughshare’; *tilvila*, ‘fertile, rich’; *bi_ja*, ‘seed’; *pippala*, ‘berry of the ficus religiosa’; *mu_la*, ‘root’; *khala*, ‘threshing floor’; *r.bi_sa*, ‘volcanic cleft’; *kevat.a*, ‘cave, pit’; *kr.pi_t.a*, ‘thick or firewood’; *s’akat.i_*, ‘cart’; *a_n.i*, ‘linch-pin’; *va_n.i*, ‘swingle tree’; *kulis’a*, ‘axe’; *ku_t.a*, ‘mallet’.(cf. Southworth, F.C., 1979, Lexical evidence for early contacts between Indo-Aryan and Dravidian, in: M.M. Deshpande and P.E. Hook, eds., *Aryan and Non-Aryan in India*, Ann arbor, pp.191-233).

Kuiper goes on to list 383 ‘foreign elements’ in the Rigvedic vocabulary of words such as: *aks.a, araru, alina, a_n.d.a, ku_la, krumu, gargara, chubuka, dr.bhi_ka, na_d.i_, phan., phaliga, bhala, man.d.u_ki, mayu_ra, mala, yaks.u, yadu, vis’pala_, s’akat.i_, s’akuna, s’an.d.ika, s’abala, sini_va_li_, sr.bida.* The approximately 380 ‘foreign words’ listed by Kuiper are computed to be nine percent of the Rigvedic vocabulary contained in Grassmann’s dictionary. “…many among these ‘Aryans’ had non-Aryan names and…this fact points to some inescapable conclusions…Statements to the effect that the Rigveda was no longer purely Aryan are therefore correct to the extent that they refer to the language and the ethnic components: both were ‘Aryan’.” (p. 96).

The use of words such as ‘foreign origin’, ‘strong foreign impact’ for as much as 80 percent of agricultural terminology is based on the euro-centric perspective of incursion of Indo-European language into Bharat creating the Indo-Aryan. Kuiper concedes: “It should not be forgotten that it was Indo-Europeanists who began to study the non-Aryan languages of India, because to them it was quite evident that a not inconsiderable part of the Sanskrit vocabulary could not possibly be of IE origin. The preceding list was drawn up from an Indo-Europeanist’s point of view…The main point is that it should be recognized that Sanskrit had long been *an Indian language* when it made its appearance in history…A language in which simultaneously Dravidian calques arose and Indo-European laryngeals were still pronounced (viz. in *tanuam, suar*) was more progressive and, at the same time, more archaic than could be imagined a few decades ago.” (p. 94).

From an autochthonous perspective, these examples of glosses point to an indigenous evolution of the Prakrits, later refined into Sanskrit.

There is no basis to assume that the Bhils of Gujarat and Madhya Pradesh originally spoke a non-IE language, probably Nahali, yet: "No group of Bhils speak any but an Aryan tongue. (...) it is unlikely that traces of a common non-Aryan substratum will ever be uncovered in present-day Bhili dialects." (von Fürer-Haimendorf 1956:x, quoted in Kuiper 1962:50).

Braziers

Bha_rati_ is a name of Sarasvati_, the godess of Speech, word, eloquence, literary composition, dramatic art; bha_rati_ means relating to Bha_rata, that is, India. In R.gveda (1.188.8), Bha_rati_, the godess of Speech is invoked with Il.a_ and Sarasvati_: bha_rati_l.e sarasvati. Bha_rati_ is also the name of a bird, a quail (Telugu). Thus, when a bull is depicted with a bird, the reference could be to bha_rati_ the bird with a rebus representation for the following substantive etyma:

> **bharatiyo** = a caster of metals; a brazier; bharatar, bharatal, bharatal. = moulded; an article made in a mould; bharata = casting metals in moulds; bharavum = to fill in; to put in; to pour into (G.lex.) bhart = a mixed metal of copper and lead; bhart-i_ya_ = a brazier, worker in metal; bhat., bhra_s.t.ra = oven, furnace.

The context for decoding inscribed objects is thus apparent. Tools of trade of metal-workers! The language is des’i or bha_s.a_ or Meluhhan! Yes, the Meluhhan which was understood by both Vidura and Yudhis.t.ira in the Maha_bha_rata. The people from Milakku are copper-workers, since milakku means ‘copper’ in Pali

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language. Meluhhans are referred to in the texts of Mesopotamian civilization. Sumerian had words of a substrate language, for example, tibira, 'merchant' may relate to ta_m(b)ra, 'copper'; san:gi, 'priest' could relate to sa_n:ghvi_, 'pilgrim's companion' (Gujara_ti_). The key to decoding is, thus, provided by the ancient lexemes of the present-day languages of the region, with intense interactions, for example, Gujara_ti_, Punja_bi_, Kon:kan.i, Kannad.a, Telugu, Tamil, Brahui, Mundari, Santali. Substrate and ad-strate words of these languages of Bha_rata hold the key to unraveling the linguistic area of the civilization, ca. 3300 to 1500 BCE.

There are some indications of close contacts between Sumerian and Dravidian as seen from a few agricultural vocabulary:

ur 'millstone' (Sumerian); *ur-al* 'mortar' (Ta.); *ulu_khala* (Skt.)
ili 'sesame' (Sumerian), *ellu/u_lu* 'sesame oil' (Akkadian); *el., el.l.u* 'Sesamum indicum' (Ta.); *tila, jar-tila* 'sesame' (Vedic)(Blazek, V. and C. Boisson, The Diffusion of Agricultural Terms from Mesopotamia. *Archiv Orientalni* 60, 1992, 16-37)

It is possible that IE **kwe-kw-lo-* 'wheel' may be related to Sumerian *gilgul* 'wheel'; (GIS-); *gigir* 'wagon'. *a_n.i* which occurs in the R.gveda as 'lynch pin' is considered foreign to both Dravidian and Vedic. IE *rota* 'rotate' may also relate to *urut.t.u* 'roll'; *urul.* 'roll' (Ta.)

These anecdotal examples point to the need for postulating a Language X to further unravel the glosses of Old Indic of the period circa 5000 years Before Present.

Language X

What language did the braziers of Bha_rata speak?

Meluhhan! The language which Vidura and Yudhis.t.hira understood, as noted in the Great Epic, Maha_bha_rata. A language spoken not too far from Gujarat. Sumerians needed an interpreter to translate Meluhhan.

Our hypothesis is that the traders with their seals, and people who travelled in Swat and Seistan, in search of minerals, were the bronze-age smiths and lapidaries of Meluhha.

Meluhhan

There is evidence of a substrate language of anient Sumer; this language could be located in Bha_rata in the contemporaneous Sarasvati-Sindhu civilization ca. 3500 -2500 BCE. Like the influence of Celtic on ancient Gaul, Sumerian shows signs of a substrate language in the use of professional names such as **sanga** 'priest', **simug** 'blacksmith' and **tibira** 'copper smith', 'metal-manufacturer'; craftsman like **nangar** 'carpenter', **a:gab** 'leather worker'; agricultural terms, like **engar** 'farmer', **apin** 'plow' and **absin** 'furrow'.

tambira = copper (Pkt.) *tibira* = merchant (Akkadian)

Sumerian <tibira> or <tabira> (written LU2 URUDU-NAGAR, i.e. "[person] copper.carpenter") means "metal worker, coppersmith".[3]

tibhi = to prop by means of a post with a V-shaped head, a prop with a V-shaped head (Santali).

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tabar = a broad axe (P.lex.)
taber = face downwards, upper side down; *taber akanae* he is lying on his face, or stomach (Santali) [Note the glyph of a woman lying upside down.]

Rebus: **t.ibri, t.ebra** = small, short of stature with large stomach (Santali)
Rebus: **tebr.a, tebor.** 'three times, thrice'; *tebr.age emok hoyoktama* you will have to give thee times that (Santali) The glyptic representation is three long linear strokes: **|||**

Recording property items

Any number of reasonable speculations may be made given the object types such as tablets which may have had many duplicates and objects such as seals and bangles which could have been carried on the person possessing the object perhaps worn on the wrist. If the script was intended to serve a personal marker in a disciplined cultural group there is a possibility that the script was used not to record personal names but to record personal items of property or OTHER items of value entrusted to the person by the collective cultural group. The script could thus be hypothesized to have served the purpose of recording the name of a commodity or product and the quantities or VALUE of such products.

"The amount of copper involved in this trade was quite considerable. One text from Ur (UET 5 796), dated to the reign of Rim-Sin of Larsa (1822-1763 BCE), records the receipt in Dilmun of 611 talents, 6 2/3 minas of copper (presumably from Magan). This shipment, according to the text, was weighed according to the standard of Ur, giving a modern equivalent of 18,333 kilograms (40,330 pounds) of copper. One-third of this copper was earmarked for delivery to Ea-na_s.ir of Ur, a merchant who had close connections with Magan and the Dilmun copper trade...**This contact beween Metopotamia and the Indus Valley, the land of Melukkha, was clearly by sea and must have brought products across the Arabian Sea and the Persian Gulf.** These products included the copper of Magan. Did they also include the tin of Afghanistan and Central Asia, perhaps the tin designated by Gudea, king of Lagash (now known to be a contemporary of Ur-Nammu, king of Ur, circa 2100 BCE), as the tin of Melukkha?" (James D. Muhly, 1995, Mining and Metalwork in Ancient Western Asia, in: Jack M. Sasson, ed. 1995, *Civilizations of the Ancient Near East*, Vol. III, New York, Charles Scribner's Sons, pp. 1501-1521).

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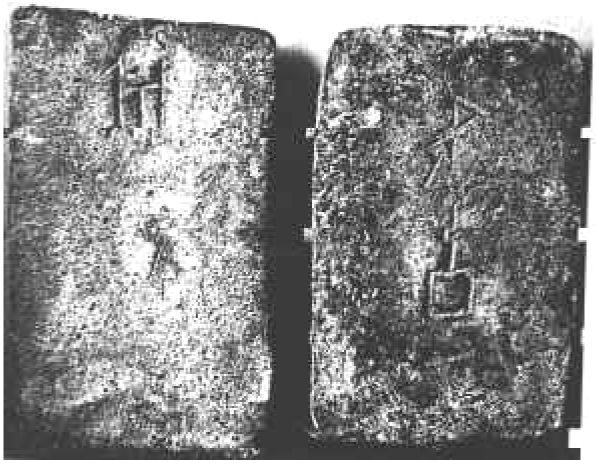
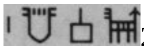
Two tin ingots with Sarasvati epigraphs

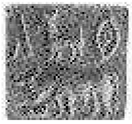
Two other rosetta stones are the two late bronze age tin ingots from the harbor of Haifa, Israel contain glyphs used in epigraphs of Sarasvati civilization!



The picture of these two ingots was published by J.D. Muhly [New evidence for sources of and trade in bronze age tin, in: Alan D. Franklin, Jacqueline S. Olin, and Theodore A. Wertime, *The Search for Ancient Tin*, 1977, Seminar organized by Theodore A. Wertime and held at the Smithsonian Institution and the National Bureau of Standards, Washington, D.C., March 14-15, 1977]. Muhly notes:"A long-distance tin trade is not only feasible and possible, it was an absolute necessity. Sources of tin stone or cassiterite were few and far between, and a common source must have served many widely scattered matallurgical centers. This means that the tin would have been brought to a metallurgical center utilizing a nearby source of copper. That is, copper is likely to be a local product; the tin was almost always an import...The circumstances surrounding the discovery of these ingots are still rather confused, and our dating is based entirely upon the presence of engraves signs which seem to be in the Cypro-Minoan script, used on Cyprus and at Ugarit over the period 1500-1100 BCE. The ingots are made of a very pure tin, but what could they have to do with Cyprus? There is certainly no tin on Cyprus, so at best the ingots could have been transhipped from that island. How did they then find their way to Haifa? Are we dealing with a ship en route from Cyprus, perhaps to Egypt, which ran into trouble and sank off the coast of Haifa? If so, that certainly rules out Egypt as a source of tin. Ingots of tin are rare before Roman times and, in the eastern Mediterranean, unknown from any period. What the ingots do demonstrate is that metallic tin was in use during the Late Bronze Age...rather extensive use of metallic tin in the ancient eastern Mediterranean, which will probably come as a surprise to many people." (p.47)

We will demonstrate that the symbols incised on the ingots are not Cypro-Minoan symbols but Harappan pictographs.

m-1336a  2515 (Mahadevan)

 m-1097 (On this seal, the antelope appears in the middle of the inscription; it is apparently this pictograph that gets normalised as a 'sign', Sign 184 and variants].

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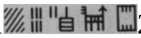
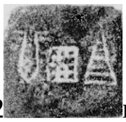
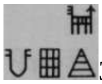
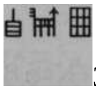
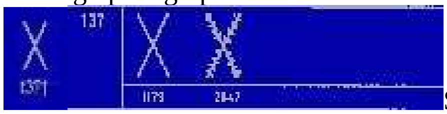
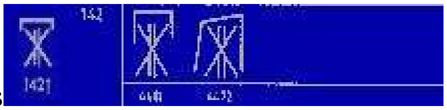
m13412092m0516At

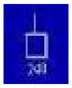
m0516Bt 3398 m0522At m0522Bt 3378

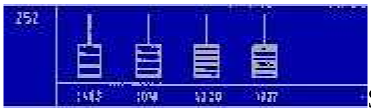
The sign pictographs are:

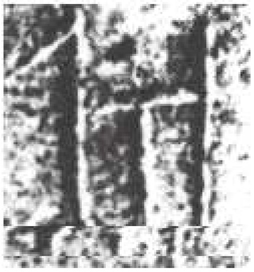
Sign 137 and variants

Sign 142 and variants

kulhi ‘the village street’ (Santali) Rebus: **kol** metal (Ta.)

 Sign 249

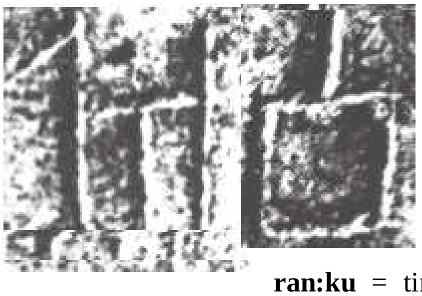
Sign 252 and variants



This pictograph clearly refers to an antelope as depicted on the Mohenjodaro copper plate inscription: (m-516b shown).

Sign 182 is a stylized glyph denoting a ram or antelope: **tagar** (Skt.); rebus: **takaram** ‘tin’ (Ta.)

On each ingot, there are two signs as shown below:



[Let us refer to these signs as, 'antelope' and X]

[Let us refer to these signs as, X and 'mould' or ‘liquid measure’].

Liquid measure: **ran:ku**; rebus: **ran:ku** = tin; rebus**: ran:ku** = antelope. Thus both liquid measure glyph and antelope glyphs are graphonyms (graphically denoting the same rebus substantive: ran:ku, ‘tin’.

X glyph which is common to epigraphs on both the tin ingots may refer to an ‘ingot’ or a **dha_tu** ‘mineral’. **upadha_tu** an inferior metal, a semi-metal: svarn.am ma_ks.ikam ta_rama_ks.ikam tustham ka_syam rati sindu_ram s'ila_jatu (Skt.)(Skt.lex.) **siddha-rasa** quick-silver (Ka.lex.) **siddha-dha_tu** quick-silver (Skt.); ore (as gold) (Ka.lex.) **cittam** < **kit.t.a** iron dross (Ta.lex.) **siddha-patra** hemp-leaves for smoking etc. (Ka.lex.) **dha_tu** strength, courage (Ka.); **dha_tu-ged.u** strength to be impaired or be gone; to become deprived of strength or courage (Ka.); **dha_tunas.t.a** loss of strength (Ka.)(Ka.lex.) The semant. ‘strength’ points to the dha_tu being tin since the addition of tin as an alloy strengthened copper. **sapta-dha_tu**, **tridha_tu** ‘seven/three elements’ are recurrently occurring compound lexemes in R.gveda.

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In RV 6.044.23 the term used is: **tridha_tu divi rocanes.u** = ‘three-fold amr.tam hidden in heaven’ is the metaphor; and in RV 8.044.12 the term is: **tridha_tuna_ s’arman.a_.**

6.044.23 This Soma made the dawns happily wedded to the sun; this Soma placed the light within the solar orb; this (Soma) has found the threefold ambrosia hidden in heaven in the three bright regions. [**ayam tridha_tu divi rocanes.u**, **trites.u, trites.u vindat amr.tam nigu_l.ham** = Soma becomes as it were ambrosia when received or concealed in the vessels at the three diurnal ceremonies, which ambrosia is properly deposited with the gods abiding in the third bright sphere, or in heaven].

8.040.12 Thus has a new hymn been addressed to Indra and Agni, as was done by my father, by Mandha_ta_, by An:girasa; cherish us with a triply defended dwelling; may we be the lords of riches. [Triply defended dwelling: tridha_tuna_ s'arman.a_ = triparvan.a_ gr.hen.a, with a house of three joints; in RV. 1.34.6, tridha_tu s'arma = va_tapitta s'les.ma dha_tutrayas'amana vis.ayam sukham; in RVV 1.85.12 s'arma tridha_tu_ni = pr.thivya_dis.u tris.u stha_nes.u avasthita_ni sukha_ni gr.ha_ni va_; Note: it is possible that the term may simply mean, three elements, copper, silver, gold].
Rebus (for the glyptic of crossing over):

da~_t.u = cross over; da.t.- (da.t.-t-) to cross (Kol.); da_t.isu – to cause to pass over (Ka.); da.t.- (da.t.y-) to cross (mark, stream, mountain, road)(Ko.); ta_t.t.uka to get over or through (Ma.); ta_n.t.u = to cross, surpass (Ta.)(DEDR 3158).

Rebus: **ta_t.u** = to strike against, come in contact with (Ka.); ta_d.uni = to gore, butt; ta_d.u = goring (Tu.); ha-n.t.u to collide (Tu.); ta_n.t.i = to hit (Kor.)(DEDR 3156).

ta_tu = powder, dust, pollen (Ta.); **to.0** = powdery, soft (of flour or powdered chillies)(To.). There is a possibility that the early semant. Of ‘dha_tu’ was cassiterite, powdery tin mineral.

The three signs used have parallels in the inscriptions of the civilization; in m-1336 the 'antelope' pictograph appears together with the 'mould' pictograph; **X** sign occurs on many inscriptions with many variants elaborating it as a junction of four roads:

The Sign 249 which is shown on the second tin ingot of Haifa, Israel is a representation of an ingot, assuming that this shows an ingot is shaped like the one taken out of a mould. The **X** sign (with a ligatured perpendicular short linear stroke) is common on both the tin ingots.

ran:ku a species of deer; ran:kuka (Skt.)(CDIAL 10559). ra_n:kava made from the hair of the ran:ku deer (Ka.lex.) ra~_kat. big and boorish (M.)(CDIAL 10538). cf. ran:ka slow, dull (Skt.)(CDIAL 10538). cf. ro_hi a kind of deer (R.)(CDIAL 10870). rauhis.a, ro_his.a a kind of deer (Ka.lex.) **ran:ku** ‘antelope’ (Santali) **ran:ku** = a species of deer (Skt.); ran:kuka id. (Skt.)(CDIAL 10559). ra_n:kava belonging to the ran:ku deer (MBh.); made from the hair of the ran:ku deer, woollen (R.); coming from ran:ku (said of animals) (Pa_n. 4.2.100); a woollen cover or blanket (MBh.R.); ra_n:kava ku_t.a s'a_yin lying on a heap of woollen rags (MBh.); ra_n:kavajina a woollen skin; ra_n:kavastaran.a a woollen coverlet (R.); ra_n:kavastr.ta covered with a woollen rug (Skt.); ra_n:kavaka coming from ran:kiu (said of men) (Pa_n. 4.2.134); ra_n:kava_yan.a coming from ran:ku (said of animals) (Pa_n. 4.2.100). ran:ku a species of deer or antelope (Skt.lex.) ran:ku = a species of deer or antelope, the spotted axis (mare)(Ka.lex.)

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kurunga = a kind of antelope; kurunga miga = the antelope deer (Pali); kulunga, kulanga (Skt.)(Pali.lex.) kulan:ga (MaitrS.); kulun:ga (TS); kuran:ga, kurun:ga (Pkt.); kuram.ga (Pali); kuran:g (P.); karam.gi_ (OG.); kura~g (G.); kurunga (Si.); kurangu the elk *Rusa aristotelis* (Si.)(CDIAL 3320). cf. kuran:g light chestnut colour (Kho.)(CDIAL 3321). **kuran:ga** = a species of antelope, antelope or deer (in general); kulun:ga = an antelope (VS 24; TS 5); kuran:gaka, kulan:ga = antelope; **kuran:gama** = an antelope; **kuran:ga_yate** to take the shape of an antelope **(Skt.lex.) kurahu** antelope (Kuwi), kuran:ga (Ka.) kulanga, kulunga = going in a herd, antelope (VS.); kulmi = a herd (TS. ii.4.5.2)

Mleccha, copper

mlecchamukha = copper (Skt.); what has the copper coloured complexion of the Greek or Mahomedans]. meriya = a rock; merayu = to shine, glitter (Te.lex.) **mer** = a kind of large copper or brass pot (G.lex.) cf. **milakkhu** = copper (Pali); mleccha = copper (Skt.)

mer.ed, me~r.ed iron; **enga mer.ed** soft iron; **sand.i mer.ed** hard iron; **ispa_t mer.ed** steel; **dul mer.ed** cast iron; **i mer.ed** rusty iron, also the iron of which weights are cast; bicamer.ed iron extracted from stone ore; **balimer.ed** iron extracted from sand ore; **mer.ed-bica** = iron stone ore, in contrast to **bali-bica**, iron sand ore (Mu.lex.)

Substantive: *med.o* merchant' clerk (Hem.Dec.); *mehto* a schoolmaster, an accountant, a clerk, a writer (G.)
Glyph: *med.ho* a ram, a sheep (G.); *mid.hia_o* (Dh.Des.); *men.d.h*, *men.d.* a ram (Skt.); *medhya* a goat; fr. *medh* a sacrifice (Skt.) **mr..eka** = goat (Te.); mlekh (Br.) **mer.h, mer.ha_,** me~d.ha_ ram (H.), med.hia_o (Dh.Des.) ram, goat, sheep (G) mid.iyo = having horns bent over forehead (G.)(CDIAL 10120). **me~r.a_, me~d.a_** = ram with curling horns (H.)(CDIAL 10120). me_t.am = goat (Ta.lex.) [cf. the pictorial motif of antelope with head turned backwards]. **merom me~t** = the goat's eye (Santali.lex.) **mes.a** = ram (RV 8.2.40) **mer.om** = a goat; mer.om jel = the hind of the ravine deer, *gazella bennettii*; mer.om (Santali)

mer.go = with horns twisted back; mer.ha, *m.*, mir.hi *f.*= twisted, crumpled, as a horn (Santali.lex.)

mer.hao = to entwine itself, wind round, wrap around, roll up (Santali.lex.) [Note the endless knot motif].

h702At h702Bt 4601 m0271 Goat-antelope with horns turned backwards and a short tail

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Three caprids. Tepe Yahya. Cylinder seal reconstructed from seven fragments. To the left of this pair is a third caprid rampant with head turned back whose horns are viewed frontally rather than in profile. Beneath the belly of each animal is a four-sided cross. There are 9 fragments of clay slab wall sealings. Wall plaster is preserved on the reverse of most fragments. Seal is carefully roled along horizontal axis of sealing. Lamberg-Karlovsky 1971: pls. 4, 5; cf. Fig. 10.27 in Pittman, 2001, opcit.

Two caprids with heads turned back rampant against a stepped platform (mountain) surmounted by a tree.

A tribute to Bharatiya enterprise and an acknowledgement to scholars

At the outset, a tribute should be paid to many savants who have provided us with enormous resources related to and analyses of the epigraphs of Sarasvati Civilization. These epigraphs are commonly referred to in the context of 'Indus Script'. This work has been made possible by the brilliant contributions made by many scholars who have devoted their lives over the last 180 years to the study of Bharatiya civilization.

The author dedicates this work, which is merely a samhita_, to the scientists and devoted researchers who set in search of the River Sarasvati and succeeded in tracing the course of this Vedic river over a staggering distance of 1600 kms. from Manasaraovar to Somnath and to those scholars who have contributed to a better understanding of the indigenous roots and autochthonous evolution of the civilization.

The samhita_ is merely a tool used to crack the code of the heiroglyphs and to delineate the glosses of an ancient language of Bharat dated to circa 5500 years Before Present.

While claiming that the code of the heiroglyphs has been summarily cracked, without any need for special pleading, the work presents the heiroglyphs which speak for themselves, *rebus*, lexeme by lexeme and glyph by glyph by simply tagging every glyph with a lexeme and its homonym in the ancient languages of Bharat. This provides the framework for delineating the glosses of Mleccha, the dialect which Vidura and Yudhis.t.hira spoke in the *Maha_bha_rata*.

In the context of the evidence presented in this work of the ground-truth of River Sarasvati which constituted the substratum support for the 'Indus (or more appropriately Bharatiya' Civilization), these epigraphs containing exquisite examples of glyptic art, will be referred to as the Sarasvati Heiroglyphs.

The epigraphs are inscribed on about 4,000 objects which include seals, tablets, copper plates and even weapons themselves. The inscribed objects have been found from over 40 sites spread across a vast area of the civilization extending from Ropar on the banks of River Sutlej across the Persian Gulf to Ur in the Tigris-Euphrates doab of Mesopotamia and from Daimabad on the banks of River Pravara (tributary of River Godavari) across Central Asia and Fergana Valley to Tepe Yahya on the Caspian Sea.

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The search for minerals and metals and for inventions of new alloys took Bharatiya from the banks of River Sarasvati, far and wide, establishing contacts with contemporary civilizations of Egypt, Mesopotamia, Europe and perhaps also Thailand (where evidence for early bronze age has been discovered).

It is no mere coincidence that (1) the lexeme **bharatiya** means 'caster of metals' in Gujarati and (2) the name of a script which diffused out of Bharat was called **Brahmi**, another name for Sarasvati, divinity **va_k**, *lingua franca*.

Concordance lists

A number of concordances and sign lists have been compiled, by many scholars, for the 'Indus' script:

Langdon, *Mohenjodaro and the Indus Civilization*, London, 1931, vol. II, pp. 434-55
Gadd and Smith, *Mohenjodaro and the Indus Civilization*, London,1931,, vol. III, Pls. CXIX-CXXIX
Vats, *Excavations at Harappa*, Calcutta, 1940, vol. II, Pls. CV-CXVI
Hunter, G.R., *Scripts of Harappa and Mohenjodaro*, 1934, pp. 203-10
Hunter, G.R., *JRAS*, 1932, pp. 491-503
Dani, A.H., *Indian Palaeography*, 1963, Pls. I-II
Parpola et al., *Materials for the study of the Indus script, I: A concordance to the Indus Inscriptions*, 1973, pp. xxii-xxvi
Mahadevan, I., *The Indus Script: Texts, concordance and tables*, Delhi, 1977, pp. 32-35
Koskenniemi, Kimmo and Asko Parpola, *Corpus of texts in the Indus script*, Helsinki, 1979; *A concordance to the texts in the Indus script*, Helsinki, 1982
Parpola, Asko, *Deciphering the Indus Script*, London, 1994, pp.70-78

Corpus of Indus Seals and Inscriptions Volumes 1 and 2

An outstanding contribution to the study of the script problem is the publication of the Corpus of Indus Seals and Inscriptions (CISI) Two volumes have been published so far:

Corpus of Indus Seals and Inscriptions, 1. Collections in India, Helsinki, 1987 (eds. Jagat Pati Joshi and Asko Parpola)
Corpus of Indus Seals and Inscriptions, 2. Collections in Pakistan, Helsinki, 1991 (eds. Sayid Ghulam Mustafa Shah and Asko Parpola)
[A third volume containing other collections outside India and Pakistan is yet to appear (2003).]

These volumes co-authored by Asko Parpola constitute the photographic corpus. The CISI contains all the seals including those without any inscriptions, for e.g. those with the geometrical motif called the ‘svastika’. Parpola’s initial corpus (1973) included a total number of 3204 texts. After compiling the pictorial corpus, Parpola notes that there are approximately 3700 legible inscriptions

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(including 1400 duplicate inscriptions, i.e. with repeated texts). Both the concordances of Parpola and Mahadevan complement each other because of the sort sequence adopted. Parpola's concordance was sorted according to the sign following the indexed sign. Mahadevan's concordance was sorted according to the sign preceding the indexed sign. The latter sort ordering helps in delineating signs which occur in final position.

Bibliographies of decipherment attempts

There have been over 100 claims of decipherment (2001). The general consensus of research scholars is that none of the claims can be deemed to have succeeded. The reasons generally adduced for treating all of them as failed attempts is that there is no rosetta stone to validate the decipherment. (Rosetta stone was a multilingual epigraph which provided a proof for the successful decipherment of Egyptian heiroglyphs).

This work presents some rosetta stones (over 8000 clusters of lexemes from all languages of Bharat and some epigraphs, with comparable heiroglyphs, on inscribed objects of neighbouring civilizations) and also provides a method for cracking the code of heiroglyphs of the civilization.

The method is, as in the case of Egyptian heiroglyphs, rebus. The heiroglyphs are read as rebus lexemes. All the heiroglyphs are read in the context of the work of the braziers who created the epigraphs. The 'script' is not syllabic, not alphabetic, but lexemic.

The reliability of the code used for heiroglyphs will be tested for almost all the 4000 inscribed objects. The language of the civilization is Mlleccha and the code has been described as Mlecchita Vikalpa in Bharatiya tradition. Mlecchita Vikalpa (Cypher writing) is listed as one of the 64 arts. Mleccha is a dialect spoken by Vidura and Yudhis.t.hira in the *Maha_bha_rata.*

The consistency with which the heiroglyphs can be explained as the tools-of-trade of braziers and metal-, fire-workers of Bharat will stand the tests needed for any sucessful decipherment claim. No special pleading is advanced. The heiroglyphs will speak for themselves as the lexemes of Mleccha unfold as a legacy of Bharatiya language repertoire.

A remarkable conclusion emerges. Mleccha was the substratum which can explain the dialectical continuum of Bharat, for glosses in the dialects of Munda, Dravidian and Indo-Aryan. This declares a paradigm change in language studies. The languages of Bharat circa 5500 years Before Present constituted a linguistic area with a semantic unity consistent with the cultural unity of the nation from Manasarovar to Kanyakumari and from Somnath to Gauhati, along 7500 km. long coastline and along the foot-hills of Himalayan ranges which stretch from Teheran (Iran) to Hanoi (Vietnam).

A comprehensive bibliography appears in Parpola, *Deciphering the Indus Script*, London, 1994, pp. 303-348.

Compendia of the efforts made since the discovery by Gen. Alexander Cunningham, in 1875, of the first known Indus seal (British Museum 1892-12-10, 1), to decipher the script appear in the following references:

Kalyanaraman, S., *Indus Script: A bibliography*, Manila, 1988

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Mahadevan, I., *What do we know about the Indus Script? Neti neti ('Not this nor that'),* Presidential Address, section 5, Indian History Congress, 49th Session, Dharwar, 2-4 November 1988, Madras..
Possehl, Gregory, *Indus Age: the writing system*, Delhi, 1996
Richard Meadow and Jonathan Mark Kenoyer, 1997, Excavations at Harappa 1994-1995: new perspectives on the Indus script, craft activities, and city organization, in: Raymond Allchin and Bridget Allchin, 1997, *South Asian Archaeology 1995,* Oxford and IBH Publishing, pp. 157-163.

A corpus of Sarasvati Heiroglyphs

Based on these resources and from the collections of inscribed objects held in many museums of the world, such as the Metropolitan Museum of Art, the corpus of Sarasvati epigraphs includig lists of Sarasvati heiroglyphs, has been made comprehensive to include almost all facets of glyptic art of Sarasvati Civilization. The corpus also includes texts of inscriptions, corresponding to the epigraphs inscribed on objects. The compilation is based mostly on published photographs in archaeological reports right from the days of Alexander Cunningham who discovered a seal at Harappa in 1875, of Langdon at Mohenjodaro (1931) and of Madhu Swarup Vats at Harappa (1940). The corpus includes objects collected in Bha_rata, Pakistan, other countries and the finds of the excavations at Harappa by Kenoyer and Meadow during the season 1994-1995.

Duplicate epigraphs

Though the corpus is limited, it is surprising that there is a substantial number of duplicate inscriptions; this has become apparent from the recent report of excavations at Harappa (1993 to 1995 seasons). Obviously, the inscriptions do not represent not 'names' of owners. The inscriptions could simply be 'functions' performed by or the 'professional title' of the person who carried the inscribed object on his wrist (or as a pendant attached to a necklace) or the list of objects he/she was invoicing for trade (as bill of lading) or to list possessions of property items listed).

This hypothesis gets re-inforced by (1) the finds of inscriptions on copper tablets (again, with many duplicates – all apparently made by a metal-worker and hence may relate to metal objects produced, say, in an armoury); and (2) the presence of over 200 inscribed objects with no sign (only pictorial motif) or just one or two signs. [The signs could hardly have been alphabets or syllables since there are not many 'names' attested in the historical periods with just one or two syllables.]
In the Bharatiya tradition, the use of copper plate inscriptions served the purpose of recording property transactions, listing possessions of property items.

Direction of writing did not matter much

"Although it seems established that the Indus script was read from right to left (summarized in Mahadevan, 1977, pp. 10-14; Parpola, 1994, pp. 64-67), seal cutters must have engraved it from left to right. This can be shown in some cases by inverting the logic used to establish directionality of reading…Mahadevan (1977, p. 14) has noted that over 6% of the written items he documented have the script running from left to right…Directionality, in at least some instances, perhaps did not matter much, leading one to suspect that it may have been what the piece represented and not what it literally said that was important. " [Richard Meadow and Jonathan Mark Kenoyer, 1997, Excavations at Harappa 1994-1995: new perspectives on the Indus script, craft activities, and city organization, in: Raymond Allchin and Bridget Allchin, 1997, *South Asian Archaeology 1995*, Oxford and IBH Publishing, pp. 157-163].

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Perspective on rebus lexemes of Mleccha

Many epigraphs are records of possessions by lapidaries and smiths: of minerals, metals and furnaces and metal artifacts. Some could have been used as bills of lading (i.e. list of shipped commodities) in trade transactions to indicate the types of metals and alloys traded.

A number of lexemes of Bharatiya languages are seen to be concordant with hundreds of glyphs on hundreds of epigraphs. This concordance relates to graphemes (i.e. words which connote the glyph) and also homonyms (similar sounding words) which connote the substantive message.

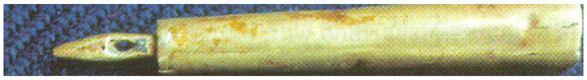
In many cases, the substantive message relates to two categories: (1) minerals and metals; and (2) furnaces and tools-of-trade of lapidaries and smiths of the civilization.

Substratum languages in Bharat of vra_tya and yajn~ika

Bharatiya languages of the linguistic area circa 5500 years Before Present can thus be reconstructed with lexemes from the substratum languages which have enriched all the language family streams of Bharat. Just as it has not been possible for linguists to classify Nahali language (considered as an isolate but with significant 'indo-aryan' lexical entries), it is virtually impossible, with the present level of linguistic studies of substratum languages in Bharat, to identify the roots from any one language represented by present-day lingua franca of the nation. Many words presented in this summary will establish the undeniable fact that there have been interactions and inter-borrowings among the so-called Munda, Dravidian and Indo-Aryan language families. Further linguistic studies are required to precisely delineate the proto-indic or Mleccha language forms.

One possibility is that the parole, the language used by artisans of the civilization, the vra_tya and the yajn~ika alike, was Mleccha which Vidura and Yudhis.t.hira spoke in the Great Epic, the Maha_bha_rata.

'Fish' glyph on gold pendant



A fish sign, preceded by seven short numeral strokes, also appears on a gold pendant:

Golden pendant with inscription from jewelry hoard at Mohenjo-daro. Drawing of inscription that encircles the gold ornament. Needle-like pendant with cylindrical body. Two other examples, one with a different series of incised signs were found together. The pendant is made from a hollow cylinder with soldered ends and perforated point. Museum No. MM 1374.50.271; Marshall 1931: 521, pl. CLI, B3. [After Fig. 4.17a, b in: JM Kenoyer, 1998, p. 196].

kanac konoc, kana kona, kana kuni 'the corners, in the corners' (Santali)

Glyphs: gan.d.a **'four';** pene **'three';**
Rebus: kan.d. **'furnace';** pen.e **'griddle'**
Glyph: **bhed.a** hako 'fish'; **bed.a** 'hearth'

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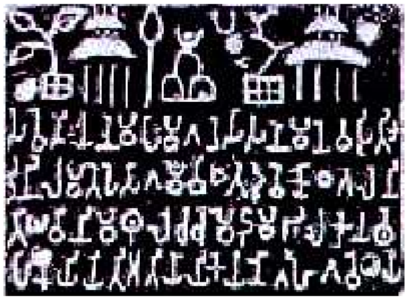
kanac ‘corner’; rebus: *kan~cu* ‘bronze’

Alternatives:

bat.hi = a furnace for melting iron-ore (Santali.lex.)

bhati = the unripe kernel of certain fruits (especially of the Palmyra palm, the Ebony tree, and makar.kenda). The kernel is taken out and eaten, the palm kernel as it is, the Ebony kernel after cleaning with water rubbing it on a stone. (Desi. Bhati).

Bharatiya tradition continues in copper plate inscriptions



Some glyphs on line 1: **kut.hi** = tree; rebus: **kut.hi** = smelting furnace; **kos.t.ha_ga_ra** = storehouse; **s'u_la** = spear; **cu_l.a** = kiln; **kan.d.kanka** = rim of jar; rebus: copper furnace; **bat.a** = quail; rebus: kiln.

The Sohgaura copper plate refers to a pair of kos.t.ha_ga_ra (dva_ra kot.t.haka); the two storehouses described as tri-garbha (i.e. having three rooms) are illustrated on line 1. (Fleet, *JRAS*, 1907). The illustrations indicate that the three rooms are in three storeys, with supporting pillars clearly seen. The inscription refers to the junction of three highways named Manavati, in two villages called Dasilimita and Usagama. The storehouses were made at this junction for the goods of people using the highways, which are indicated in line 3 by mentioning the three places to and from which they led. One of the names give is reognized by Fleet as Chanchu. (Fleet, *JRAS*, 63, 1894 proceedings, 86, plate, IA 25. 262; cf. Sohgaura copper plate/B.M. Barua. *The Indian Historical Quarterly*, ed. Narendra Nath Law. Reprint. 41)

Punch-marked coins from 5th cent. BCE, from many parts of Bharat, depict many glyphs, many of which are comparable to the glyphs depicted on inscribed objects of the Sarasvati Sindhu Civilization.

As the heiroglyphic code unravels, the meaning of the glyphs and their importance in the context of the lives of braziers is reinforced. Many glyphs are property possessions of lapidaries and metallurgists and evoke the tools of trade – furnaces, minerals and metals -- used in the smithy.

It is hypothesised that the inscriptions on copper plates and the symbols on punch-marked coins are the work of inheritors of the Sarasvati brazier-tradition.

This cultural tradition explains why copper plates are used for property transactions during the historical periods and also explains why many symbols on punch-marked coins are directly comparable with the Sarasvati heiroglyphs.

This is the most emphatic evidence for discerning the cultural continuity into historical periods of the tradition whose roots are to be found on the banks of River Sarasvati, dating back to 5,500 years Before Present.

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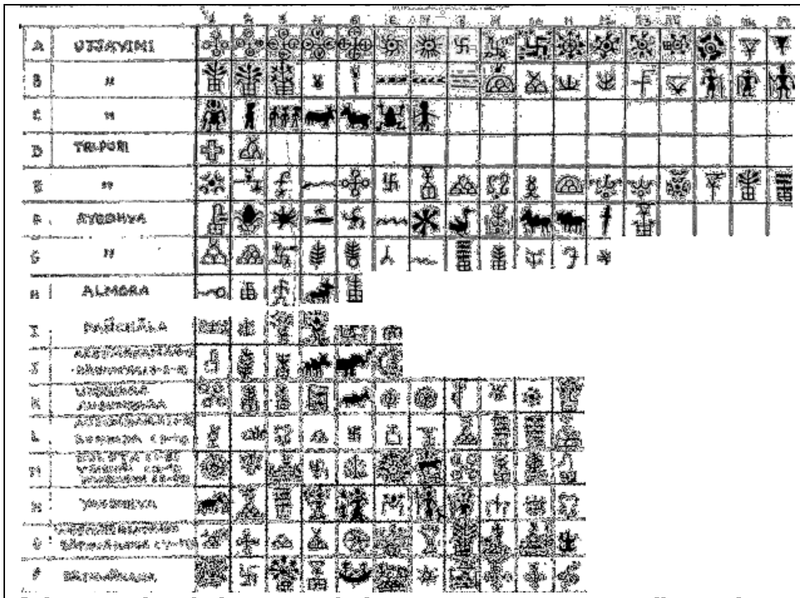

[Pl.8, Local Tribal coin symbols: Ujjayini, Tripuri, Ayodhya, Almore, Pa_n~ca_la, Arjuna_yana (1-3), Ra_janya (3,6,8), Uddehika, Audumbara, Kun.inda, Kuluta, Vr.s.n.i, Yaudheya, Ks.atrapa, S’a_tava_hana]

[After Pl. 10 to 13 in: Savita Sharma, 1990, *Early Indian Symbols: Numismatic evidence*, Delhi, Agam Kala Prakashan]

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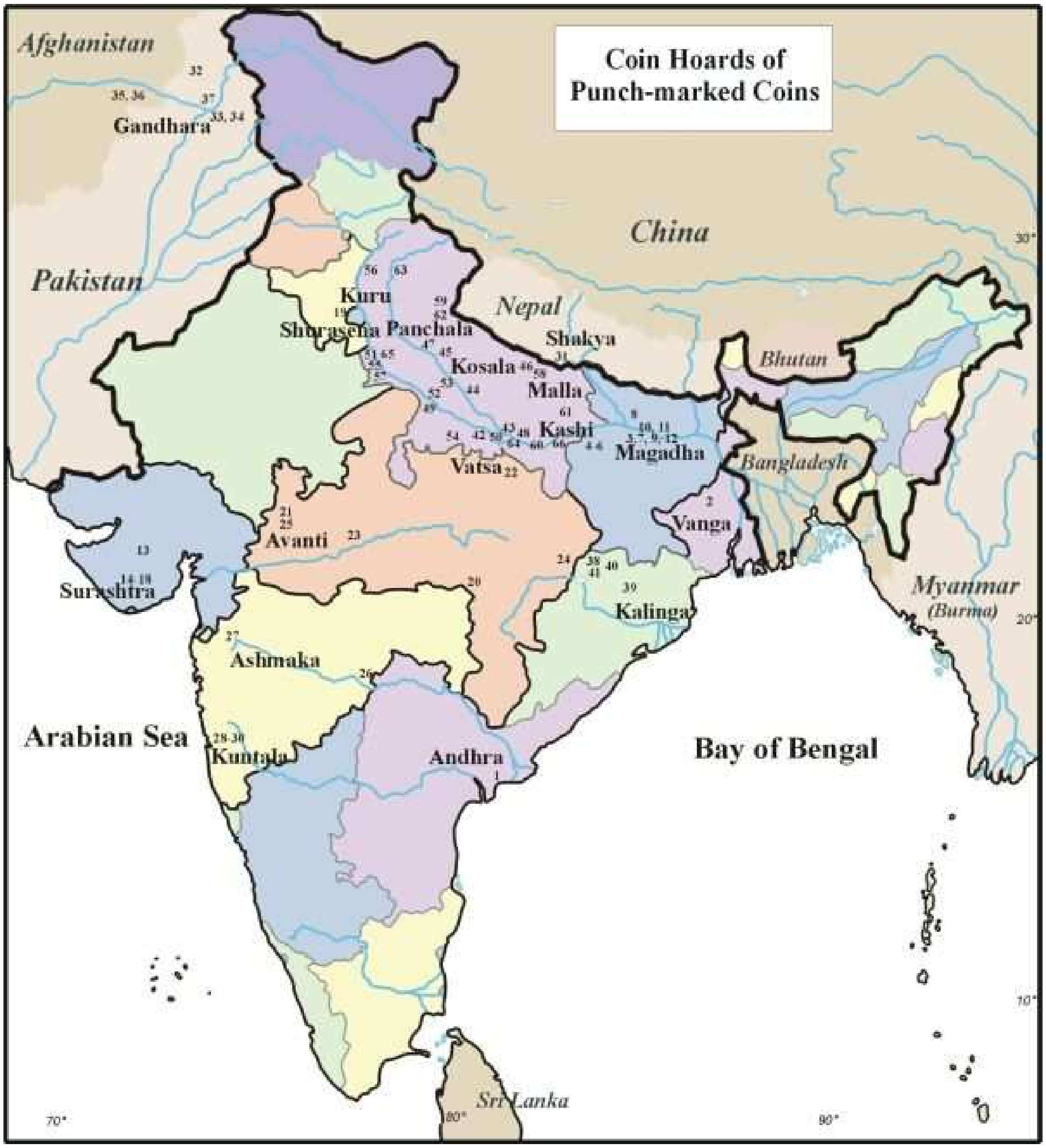

Map showing hoard sites of punch-marked coins

Tha pattern of punch-marked coin hoard sites is comparable to the pattern of black and red ware/rice cultivation sites of proto-historic periods.

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Linguistic area of Sarasvati Civilization

A major problem in establishing the continuity of the Bha_rati_ya civilization beyond ca. 1300 BCE is the as yet unresolved problem of the decoding of the inscriptions of the Sarasvati-Sindhu civilization.

The underlying hypothesis of the analysis presented herein is that the Bha_rati_ya languages constitute the core legacy from the linguistic area of this civilization.

A simple step is attempted and presented, based on the orthographic-semantic framework that the epigraphs are composed of heiroglyphs which can be read *rebus*.
The pictorials in inscriptions on media unearthed in archaeological excavations (and taken from the exquisite corpuses of Mahadevan and Parpola) are tagged to the morphemes of the languages of Bharat.

Using the rebus principle, homonyms with substantive meanings are identified: such as the tools of jeweller-smithy, turner, silver-trader.

The use of the rebus methodology is justified on the following evidence and analysis:
The pictographs to which 'sound-bites' need to be tagged, as keys to the process of decoding the inscriptions, cover a wide range and number of inscribed objects as shown by the following frequencies (out of 13,372 occurrences of signs and 100 pictorial motifs (the frequencies are only indicative numbers, hence, approximate and are subject to change as the orthography of many pictographs and signs get more precisely identified):

Frequency range	No. of signs	Total sign occurrences	Percentage	Cumulative percentags
1000 or more	1	1395	10.43	10.43
999-500	1	649	4.85	15.28
499-100	31	6344	47.44	62.72
99-50	34	2381	17.81	80.53
49-10	86	1833	13.71	94.24
9-2	152	658	4.92	99.16
Only once	112	112	.84	100.00

Thus, only 67 signs account for a total of 80.53 percent of all occurrences of signs on inscribed objects.[After Mahadevan, 1977: 17].

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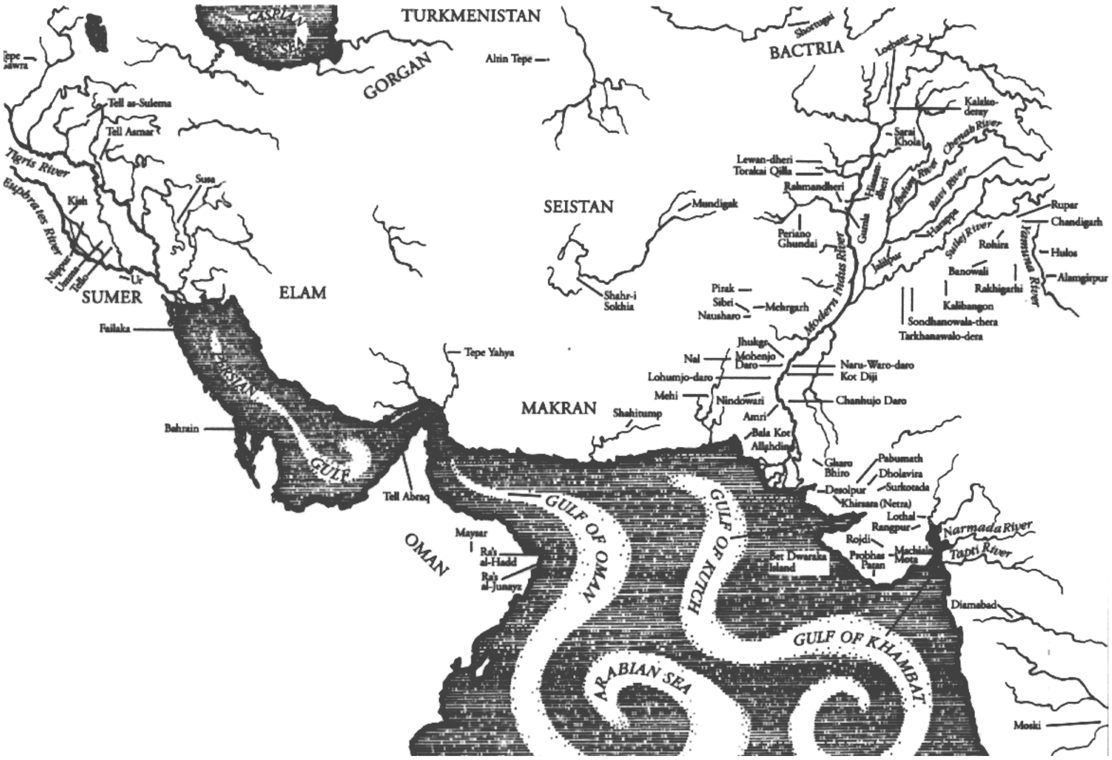

Over 45 sites where objects with epigraphs have been discovered – dated circa 3300 BCE to 1500 BCE. The sites extend from Tepe Gawra on Tigris river on the west to Alamgirpur on Yamuna river on the east; from Altin Tepe in the north -- east of Caspian Sea (south of Turkmenistan) to Maski on Krishna river on the south.

The expanse across the Persian Gulf and along the coastline of the Arabian Sea is matched by the riverine sites on the banks of Rivers Sindhu and Sarasvati.

The rivers and the coastline were a veritable waterway enabling an extraordinary reach of the civilization exemplified by about 4,000 objects with epigraphs over this vast region stretching over 5000 kms from east to west and 2000 kms. from north to south and over a time horizon of nearly two millennia.

(Map after Asko Parpola and Jagatpati Joshi, 1988, *Corpus of Indus Seals and Inscriptions, Volume 1*, Helsinki, Academia Scientiarum Fennica and Map 8 in: Jane R. McIntosh, 2002, *A Peaceful Realm – the Rise and Fall of the Indus Civilization*, New York, Westview Press).

The clustering of the find sites around the Sarasvati Sindhu river basins and the coasts of Gulf of Khambat and Kutch point to Meluhha (mleccha) as the language underlying the epigraphs. The key to identifying the linguistic area lies in the fact that out of the discovery sites many are on Sarasvati Basin wherefrom the Bharatiya cultural identity emerged. The clue is apparent. The present-day languages of Bharat are to be traced to the language lineage of this basin which nurtured a riverine, maritime civilization. These languages hold the rebus key to the Sarasvati heiroglyphs.

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Epigraph Discovery Sites and Epigraphs held in Museums

The epigraphs of Sarasvati (Bharatiya) Civilization contained in over 3000 objects present a remarkably uniform writing system over an expansive area and from over 45 sites ranging from Rakhigarhi on the east to Shahitump on the west, from Ropar on the north to Daimabad in the south. Epigraphs have also been found in neighbouring civilization sites such as: Ur, Tepe Yahya, in areas now called Iran, Iraq and Persian Gulf States.

Alamgirpur
Allahdino
Amri
Balakot
Banawali
Bet Dwaraka
Chandigarh
Chanhudaro
Daimabad
Desalpur
Dholavira
Gharo Bhiro (Nuhato)
Gumla
Harappa
Hissam-dheri
Hulas
Jhukar
Kalibangan
Kalako-deray
Khirsara
Kot-diji
Lewandheri
Loebanr
Lohumjodaro
Lothal
Maski
Mehi
Mehrgarh

Mohenjodaro
Nindowari-damb
Nausharo
Naro-Waro-dharo
Pabumath
Prabhas Patan (Somnath)
Pirak
Rangpur
Rakhigarhi

Rahman-dheri
Rohira
Rojdi
Rupar
Shahi-tump
Sibri-damb
Surkotada
Tarkhanewala-dera
Tarakai Qila
Unknown Provenance
Museum Guimet, France
Harappa 1993-95 excavations
Proto-elamite glyptics
Mohenjodaro: other objects
West Asia
Near East
Ashmolean Museum, Oxford
Tell Suleimah, Iraq
Pierport Morgan Library, New York
Tell Asmar (Eshnunna), Iraq
Gulf states
Early Harappan bowl with 'fish' glyph
Nippur
Ur
Saharanpur, Western Uttar Pradesh
Metropolitan Museum of Art, New York
Nausharo and other sites
Inscribed objects from Harappa 2000-2001
Manuscripts in Schoyen Collection

Parallels from Mesopotamia (and Anatolia)
Shaft-hole axhead (Bactria-Margiana)
Anatolia and the Caucasus
Bulla-envelope, Adab, Sumer
Royal Ontario Museum
Burdin Fine Arts Exhibition
Steatite seals in the British Museum

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Heiroglyphs and frequencies of occurrence on epigraphs

One-horned bull with a pannier	1159 + 5 (with two horns)
Shor-horned bull	95 +2 (in opposition)
Zebu or Bra_hman.i bull	54
Buffalo	14
Elephant	55 + 1 (horned)
Tiger (including tiger looking back)	16 + 5 (horned)
Boar	39 + 1 (in opposition)
Goat-antelope	36 + 1 (flanking a tree)
Ox-antelope	26
Hare	10 +1 (object shaped like hare)
Ligatured animal	41
Alligator	49
Fish	14 (objects shaped like fish); fish also a sign
Frog	1
Serpent	10
Tree	34 + 1 (leaves); leaf also a sign **tebr.a, tebor**. = thrice (Santali) **ta(m)bra** = copper (Pkt.); **tibira** = copper merchant (Akkadian)
Dotted circle	67 **ghan:ghar ghon:ghor** 'full of holes' (Santali); rebus: **kan:gar** 'portable furnace (K.)
Svastika	23 rebus: **satthiya_** 'dagger, knife' (Pkt.) **satva** 'zinc' (Ka.)
Endless-knot	4
Double-axe	14 (inscribed objects shaped like axe)
Standard device (lathe, portable furnace)	19
Rimmed narrow-necked jar	1395
Fish signs	1241
Leaf signs	100
Spoked wheel	203
Cart frame + wheels	26
Sprout (or, tree stylized)	800
Water-carrier	220
Scorpion	106
Claws (of crab)	130 + 90 (shaped like pincers)
Arrow (spear)	227
Rimless, wide-mouthed pot	350

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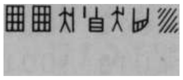
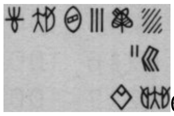
Dagger and axes found in an Ur grave **Sumerian double-bladed axe, Ur** [V. Gordon Childe, 1929, *The Most Ancient East: the oriental prelude to European prehistory*, London, Kegan Paul, Trench, Trubner and Co. Ltd., Fig. 72 b.]

Copper tablet (Double-edged battle-axe): Mohenjodaro M 0592B
kud.i sakam the blade of the kudali (Santali.lex.) [Note the pictorial of 'leaf'; it may be read as 'sakam' or leaf, i.e. the metal blade of a weapon].guji kud.i = a kod.ali or hoe worked by taking hold of both ends of the handle (Santali.lex.) kat.a kud.i = pronged hoe; kat.a kat.i = cutting; to slash, kill (Santali.lex.).

m0592At m0592Bt  3413 Pict-133: Double-axe (?) without shaft. [The sign is comparable to the sign which appears on the text of a Chanhudaro seal: Text 6422, Chanhudaro Seal 23]. Chanhudaro23  6402 Goat-antelope with a short tail. The object in front of the goat-antelope is a double-axe.

Unit of analysis: inscribed object

We have to be very cautious in interpreting the individual signs and individual pictorials; because, given the small size of the corpus, virtually ANY lexemic or phonemic or even artistic (cultural) value may be assigned and ANY language may be read into the inscriptions, if inscriptions they are, ‘readable’ in a language and do not merely represent artistic extravaganzas.

Total objects presented in Parpola pictorial corpuses and Mahadevan concordance are a statistically small population, further fragmented due to the 400 to 500 signs (including variants and ligatures of basic signs) and over 100 (including variants and pictorial ligatures yielding the so-called 'fabulous' animals categories). Thus, statistical stratification techniques assuming a normal distribution of population cannot provide statistically verifiable results.

Hence, an inscribed object is the unit of analysis.

Considering that as many as 273 (111 + 42 + 120) inscriptions are communicated using two signs or less (with or without a pictorial motif or 'field symbol'), it may not be appropriate to assign syllabic or alphabetic values to each sign or each pictorial. Each pictorial or each sign may contain a 'word' or 'lexeme'.(Unless, of course, the entire messaging system is cryptographic using 'syllabic' or 'alphabetic' codes; this we think, is unlikely considering the nature of the cylinder seals in Mesopotamia mainly with pictorials used to convey movable property items.)

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One clue emerges from the fact that there are inscribed object with only pictorials (i.e. without any sign constituting a 'text'): the pictorials are as important as signs and must be 'deciphered' to understand the message conveyed by the inscription on an object.

Another clue may be surmised considering that there are inscribed objects with just a single sign: a sign by itself may constitute a message and hence may be a lexeme.

Nature of objects with epigraphs

Possessions and objects made could be described on epigraphs on many types of objects, such as: seals, tablets, copper plates, bangles and even on a monumental display-board (like an advertisement hoarding).

The frequencies in parenthesis are based on Mahadevan conordance (which excludes objects that do not contain a 'sign'); the actual numbers will be higher based on the more comprehensive Parpola photo corpus which includes inscriptions containing only pictorials.

Seals (1814)
Tablets (in bas-relief or inscribed) (511)*[including Seal Impressions]
Miniature tablets (of stone, terracotta or faience) (272)
Copper tablets (plates) (135)
Bronze implements/weapons (11)
Seal Impressions*
Pottery graffitii (119)
Ivory or bone rods (29)
Inscribed on stone, bracelets (or, bangles), Ivory plaque, Ivory dice, Carnelian tablet, Terracotta ball, Brick (15)
Display-board (Dholavira or Kotda with 10 signs, possibly atop a gateway) (1)

Almost all the miniature tablets are from Harappa; almost all copper tablets are from Mohenjodaro. An inference is that the miniature tablets served the same function as the copper tablets which evidence repetitive messages or sign sequences.

Many epigraphs could have been recorded only by metal-smith-fire-workers

This classification provides a clue as to the function served by many inscriptions: inscriptions on bronze implements/weapons (11) and copper tablets (135) could perhaps have been done only by a metal-smith-fire-worker. There is a reasonable inference here: many messages may relate to the 'economic activity' of metal-smiths. This inference is consistent with the emergence of the Bronze Age in neighbouring civilizations which have also attested to contacts with the Sarasvati-Sindhu civilization sites (witness, for e.g. the finds of cylinder seals in Bha_rati_ya sites and the finds of 'Indus' seals and artefacts in Mesopotamian sites.)

Glyptic art in epigraphs

The pictorials in inscriptions are composed of both signs and field symbols (glyphs). Many signs of the script are clearly derivatives from pictorial motifs (glyphs). For example, there are over 50 seals depicted in the Parpola pictorial corpus containing the motif, svastika as a field symbol. Similarly

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there are inscriptions containing the motif of a dotted circle which has not been recognized as a sign of the script by the corpus compilers.

Many pictorial motifs which recur on inscribed objects of Sarasvati Civilization are seen on ancient seals of the historical period of Bha_rata. It is notable that most of the later-day seals using the motifs of Sarasvati Sindhu Valley Civilization (SSVC) are relatable to royalty or military offices, to crafts and trade: nigama, kulika, ta_mboli_, ca_turvidya (learning of the four Veda). The devices such as the jar, cakra, zebu, persons seated in yogic posture, dotted circle, tree, svastik_, water-carrier, three-hills seem to have attained auspicious connotations, since the devices are apparently unrelated to the inscriptions mostly in Bra_hmi script (as also evidenced in the as.t.aman:galaka ha_ra on Bharhut sculptures of Yaks.i].

Sealing, yu_pa in railing and man with a bahangi (water-carrier paralleling the SSVC pictorial motif) and a hollow cross, Sonpur, Directorate of Mus. And Arch., Bihar Govt., Patna.

Copper signet, Kaus'a_mbi, Allahabad Museum, no. 100: seal impression [After Pl. 1,1b in: Kiran Kumar Thaplyal, 1972, *Studies in Ancient Indian Seals*, Lucknow, Akhila Bharatiya Sanskrit Parishad] The device is a pair of antelopes with their heads turned back. There are many epigraphs of the civilization with such glyphs of antelopes with their heads turned backwards.

Sealing of king Abhaya (legend: Ra_jn~(o) Abhaya(sya), Rajghat, Bharat Kala Bhavan, no. 6049. Device: humped bull (Zebu?)[After Pl. II,4 in: Thaplyal, 1972]

Clay lump bearing impression of the seal of the offices of (a) kuma_ra_ma_tya and (b) bala, Ahichchatra_, Antiquity section of the ASI, New Delhi, No. AC II 4448. 2. Sealing of the military office attached to the Yuvara_ja-bhat.t.a_raka, Basarh, Indian Museum, Calcutta, No. A 11315—NS 6159.

Sealing of the *Ca_turvidya* of Ra_jagr.ha, Nalanda, Indian Museum, Calcutta. The device includes two persons seated in yogic posture paralleling similar postures on SSVC inscribed objects. [After Pl.XXVII, 5 in: Thaplyal, 1972]

Divinity

Double-spiral on a copper pin at Manda, Himachal Pradesh (c. 3rd millennium BCE)

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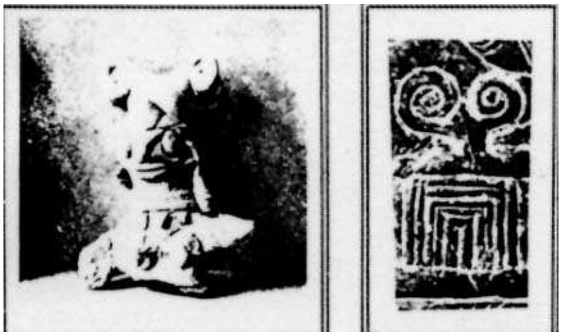
This double-spiral motif occurs both at Harappa and Ur in the context of depicting a godess.



Head-dress of a terra-cotta godess figurine.(Left) Harappa. Right: Double-spiral, a symbol of a Babylonian godess. [After Pl.IV, 7 and 8 in: Gregory L. Possehl, ed., 1979, *Ancient Cities of the Indus*, Delhi, Vikas Publishing House Pvt. Ltd.]

The most remarkable feature of the civilization during all its phases from 7000 to 1000 BC is the homogeneity of monuments and artifacts; the agreement among Harappa, Mohenjodaro, Kalibangan, Dholavira, Banawali, Kunal and Lothal is striking indeed, while regional variations are overshadowed by the preponderant shared features of life such as domestication of animals, cultivation of wheat and barley, canal irrigation and use of wells, house-building, organization of towns, weaving of textiles, wheel-turned pottery, river navigation, use of carts, metal-working, ornament-making using faience, ivory, bone, shell and semi-precious stones and use of inscriptions to facilitate trade. (cf. Marshall, John, 1931, The age and authors of the Indus Civilization. in: Marshall, John, ed., *Mohenjodaro and the Indus Civilization*, 3 vols., Arthur Probsthain, London: 102-12). The homogeneous nature of the culture was evolved and sustained over the largest Bronze Age civilization of the world, covering an estimated area of 1,310,000 square kilometers. This is in comparison with the Mesopotamian Civilizzation which covered an estimated area of 400,000 square kilometers during the Akkadian Dynasty and with the Egyptian Civilization which covered a small area of ca. 17,100 square kilometersduring the Old Kingdom. (Butzer, Karl W., 19776, *Early Hydraulic Civilization in Egypt: A study in Cultural Ecology*, Chicago, University of Chicago Press, Prehistoric Archaeology and Ecology Series: 83). The region covered the entire drainage system of the Sarasvati River, the northern Ganga-Yamuna doab in Uttar Pradesh, Punjab, Haryana, western fringe of southern and central Rajasthan, Gujarat, almost the whole of Pakistan (excepting for the northern mountainous areas) and southern Afghanistan. That homogeneity in culture was maintained over such vast distances given the transport systems of river crafts and bullock-carts (and perhaps pack-animals) is an era of peaceful coexistence unparalleled in the history of human civilization. For example, the mature Harappan pottery was seen over all parts of the civilization area and so were the seals, styles of beads, brick sizes and weights commonly shared. This lends credence to the possibility that this entire area was truly a Linguistic Area and given the legacy which continued in India into the historical periods, the decipherment of the inscriptions have to be related to the essential semantic unity of languages currently spoken in many parts of India also as a legacy of the cultural unity sustained during ancient times. On the aspects of cultural unity, Possehl notes (1999, p. 157): “From the archaeological record one senses that in spite of this differentiation, we are still seeing a single ancient culture at some level of abstraction. How were the norms of this culture maintained over such immense distances? What kept it all together? The answer to these questions is obviously ‘communication’, either direct, face to face contact, or a more indirect form. Without some convention of communication, areas that are geographically removed from one another tend to take their own course of cultural change and gradual differences will emerge. The two most obvious mechanisms that can be documented that would have sustained the mid-range and longer communication networks are the movements of pastoral nomads, and other itinerants, some of which are tied to seasonal changes, and the internal commerce of the Indus Age.”

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A common lingua franca which is traceable to later day bharatiya languages bound these people together in their communications. This is in consonance with the continuity of culture in Bharat, right from the microlithic times through the days of Sarasvati civilization.

Paul Thieme demonstrated that the gods of the Mitanni treaties of ca. 15th century BCE, are specifically Vedic gods, and that they cannot be Proto-Aryan. All the four treaty gods are mentioned in one hymn of the R.gveda (RV. 10.125.1). Macdonnel is more emphatic: "It is a fact, however, that this particular grouping of the gods Varun.a and Mitra, Indra and Na_satyau, with these forms of their names, can be traced *only in the Veda*. For this reason I agree with Jacobi, Konow and Hillebrandt in considering these gods to be *Indian*, *Vedic* deities and that there is no possible justification for any other view. We shall have to assume that, just as there were Aryan immigrations into India from the west, there must have been isolated migrations back to the west." (Macdonnel, opcit, 1927, p. 805). These treaties point to a movement of Vedic tradition from Sarasvati river basin, from east to west.

Alfred Hillebrandt argues that the degradation of the term asura- (from its basic meaning 'lord' to the meaning of 'evil spirit') occurred because of the encounters between Indians and Iranians after their separation, but before Zarathus'tra's reform. He adds that the phrase **he 'lavo** attributed to the asuras in the S'atapatha Bra_hman.a indicates that Indian enemies from the east are also included among asuras, since this phrase would be a Prakrit form from that area. (Alfred Hillebrandt, *Vedische Mythologie,* 3 vols., Breslau, Verlag von M. and H. Marcus, 1902, vol 2., p. 440). The following Indic etyma may explain the use of the term he 'layo: halla_ = tumult, noise (P.Ku.N.B.Or.H.); halphal = shaking, undulation (A.)(CDIAL 14017). Hallana = tossing about (Skt.); hallai – moves (Pkt.); alun = to shake (K.) ale, alaku = to shake (Ka.)(CDIAL 14003; 14918). Hillo_la = wave (Skt.); hillo_layati = swings, rocks (Dha_tup.); hilorna_ = to swing, rock to and fro (H.); hilolai = shakes (OMarw.) (CDIAL 14121). Hillo = a jerk, a shake; a push; a shock; hello = a jolting of a carriage (G.) helao = to move, drive in (Santali). The semantics, 'rocking to and fro' and 'wave' point to sailing on high seas. This is authenticated by a Tamil lexeme: e_le_lo = a word that occurs again and again in songs sung by boatmen or others while pulling or lifting together; e_le_lan- = name of a Chola king; e_lappa_t.t.u = boatmen's song in which the words e_lo_, e_le_lo occur again and again (Ta.lex.) This leads to a possible interpretation of some of the mlecchas, who shout, 'he 'lavo, he 'lavo', as 'sea-farers' and is consistent with the evidence of economic texts from Mesopotamia which point to extensive trade relations with 'meluhha', which is generally equated with the Indic civilization area.

S.C.Roy notes that Mun.d.as have a tradition that India was previously occupied by a metal-using people called Asuras. One tribe of the Mun.d.a group are called Asuras today. (Rai Bahadur S.C. Roy, The Asuras—ancient and modern, *The Journal of the Bihar and Orissa Research Society,* 12, 1926, 147). This analysis is consistent with the characterization of asura- with creative activity. Considering the sea-faring merchants of Indic civilization had traded in metals and ores over an extensive area and the evolution of the bronze-age, ca. 3500 B.C. in the region with the invention of alloying copper with tin to yield bronze and manufacture of hardened metallic weapons and tools, the dominant 'lordship' of the civilization would have rested with the people with asuric or creative capabilities, who were later identified as a group of people called 'asuras'.

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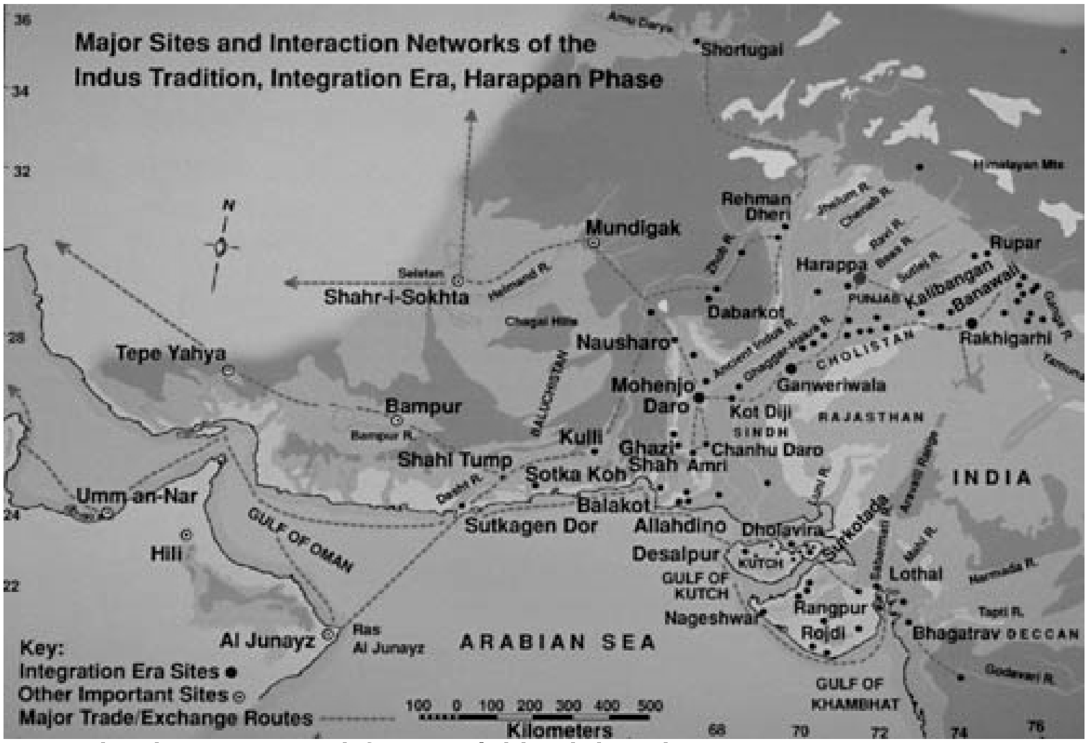

Networks that connected from Meluhha (Bharat) during the Harppan Period (2600-2000 BCE) with their hinterlands – Sarasvati and Sindhu River Basins and distant resource mobilization and trading areas [After Kenoyer, 1998]

Vedic age was a peaceful age and the devas respected the asuras as their neighbours; indeed, the devas even worshipped the asuras for their superior power:

> **yatha_ deva_ asures.u s'raddha_m ugres.u cakrire (RV 10.151.3)**
> "Just as the devas rendered faithful worship to the powerful asuras…"

Two views of the formation of North Dravidian. are elucidated by Elfenbein, J.H., 1987, A periplous of the 'Brahui problem', *Studia Iranica*, 16; pp. 215-33. A pattern of separation of the Brahuis is suggested consistent with the suggestion earlier made by Jules Block that the Brahuis came to Baluchistan from South or Central India where other cognate languages were spoken. The vocabulary of Brahui is strongly influenced by Sindhi and Siraiki with substrate Indic words which find many cognates in Marathi, Gujarati and Kurukh languages; these verily constitute the substram Pra_kr.ts which influenced Vedic Sanskrit with words such as khala (threshing floor), la_n:gala (plough)..

H. Skold argued that asura could not have been derived from as's'ur. If the derivation were true, the s' in as's'ur should appear in Sanskrit as s' and in Avestan as s, not as the s and h we have in asura- and ahura-.(Hannes Skold, Were the Asuras Assyrians? *The Journal of the Royal Asiatic Socierty of Great Britain and Ireland*, April 1924, pp. 265-7). Von Bradke suggested that asura- could derive from as, 'to be', or ans, 'to support', perhaps the latter. (P.von Bradke, Beitrage zur altindischen Religions – und Sprach-geschichte, *Zeitschrift der Deutschen Morgenlandischen Gesellschaft*, 40,

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1886, 347-8). Polome connects as’s’ura with Hittite has’s’us, which means king. (E.Polome, L’etymologie due terme germanique *ansuz ‘dieu soverain’, *Etude Germanique*, 8, 1953, 41). Schlerath analyzes asura as as-ura and derives Avestan ahu- and ahura-, Indic asura-, Hittite has’s’u and Latin erus from reconstructed root *axs- meaning ‘beget’. (Bernfried Schlerath, Altindisch asu-, Awestisch ahu- und a_hnlich klingende Worter, in: *Pratida_nam: Indian, Iranian and Indo-European Studies presented to Franciscus Bernardus Jacobus Kuiper on his Sixtieth Birthday*, ed., by J.C. Heesterman, G.H. Schoker, and V.I. Subramoniam, The Hague, Mouton, 1968, p. 146). Hale proposes an alternative to Schlerath’s etymology by suggesting an Indo-European *Hesu- from which came Avestan ahu- ‘lord’ and Hittite has’s’u ‘king’ and an Indo-Iranian derivative of this word, *asura- from which Avestan ahura- and Vedic asura- derive.. (Wash Edward Hale, opcit., p. 36). Hale’s argument is not convincing; if *Hesu- could have yielded Hittite has’s’u, Vedic asura- could also have yielded the Hittite has’s’u and Assyrian as’s’ura. Such a straight-forward Vedic-Avestan route may also explain the presence of Sanskrit lexemes in Kikkuli’s horse training manual, Indic names among the names of Mitanni kings and Vedic deities named in the Mitanni treaty. A validation of this hypothesis can be made by tracing the so-called Dravidian lexemes in R.gveda and identifying concordant Avestan glosses.

The linguistic arguments favouring the hypothesis that Vedic language was an indigenous evolution in Bharat are presented by Winternitz in a different context: “The vedic language differs from Sanskrit almost not at all in its phonetic content but in its greater antiquity especially by a richer stock of grammatical forms. Thus for example, Ancient Indian has a subjunctive which is lacking in Sanskrit; it has a dozen different infinitive endings of which there is only one left behind in Sanskrit. The aorist forms, plentifully represented in the Vedic language disappear more and more in Sanskrit. The case-endings and personal endings are more perfect in the oldest language than in later Sanskrit.” ((Maurice Winternitz, 1907, *Geschichte der Indischen Literatur*, tr. *A History of Indian Literature*, 1981, Delhi, Motilal Banarsidass, pp. 35-36). There is undoubtedly close relationship between the language of the Veda and the Indo-Iranian basic language as evidenced by the earlier texts related to the Avestan language which evolved into the Ancient Persian of cuneiform inscriptions and the Ancient Bactrian of the Avesta.

Language of the Indus People: mleccha

There is no evidence, whatsoever, that the Munda influenced directly the Avestan. On the contrary, there are many words in the R.gveda which can be traced to the Munda-Dravidian substrate. The Avestan words cognate with the Rigvedic are explainable as derived from the Vedic language which included the Para-Munda substrates in the earliest Vedic period in the region which came to be called Bharatavars.a.

The pura_n.ic and epic age was an era of cultural fusion. “Intermarriages between the two tribes (devas and asuras) continues unchecked. Bhi_ma married Hidimba_, the son, born of their union, Ghat.otkaca fought on behalf of the Pa_n.d.avas in the Kuruks.etra battle. Aniruddha, the grandson of Va_sudeva married Us.a_, the daughter of Ba_n.a_sura. Pururava_’s son A_yu married the daughter of Svarbha_nu, an asura. Not only the inter-tribal marriages was acceptable, even the earlier Brahmanical law-givers went to the extent of including the custom of Asura form of marriage into their law-books and called Asura marriage. In such marriage, the bride was bought from her father by paying bride price (A_s’vala_yana Gr. S. 1.6; Baudha_yana Dharma S. 1.35; Gautama Dharma S. 4.12; Manusmr.ti 3.31). The Vasis.t.ha Dharma Su_tra (1.35) recognizes such marriage belonging to Manus.a form. Though other sacred texts look on it with disfavour, the

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Arthas’a_stra (3.2.10) allows it without criticism: pitr.prama_n.a_s’ catva_rah pu_rve dharmya_h ma_tr.pitr.prama_n.a_h s’es.a_h. As for instance the marriage of Das’aratha of Ra_ma_yan.a and Pa_n.d.u of Maha_bha_ratta may be taken. Das’aratha of Ayodhya_ married Kaikeyi_and their son was illustrious Bharata. The sister of S’alya namely Ma_dri_ was united with Pa_n.d.u on payment of heavy bride price (MBh. 1.105.4-5)…Pura_n.as…Yaya_ti married S’armis.t.ha_, the daughter of the Asura king Vr.s.aparva_ and had three sons namely Druhyu, Anu and Puru. Because of his affiliation with the mother’s side, Puru was called an Asura…matriarchal nature of Asura society…the celebrated Brahminical myth of the churning of the oceasn is a popular ojne, where the Asuras seize the ambrosia, churned out of the ocean before the gods took possession of it…”. (Upendranath Dhal, *Mahis.a_sura in Art and Thought*, 1991, Delhi, Eastern Book Linkers, p.27).

As’ur (Akkadian) has, by the nineteenth century BC, been recognized as the national god of Assyria. In political terms, he bestowed the scepter and the crown and blessed the Assyrians. (Tikva Frymerkensky, Ashur, *Encyclopaedia of Religion*, Vol. I, Ed. M. Eliade, pp. 461 ff.) The enmity of Asuras with the gods is noted. (Brown, W.Norman, Proselytizing the Asuras: A noteor R.gveda 10.12, *Journal of the American Oriental Society*, 39, Part 2, 1919, pp. 100-103). Historicity of the Asuras is evaluated and Asuras are described as immigrants from Assyria and were the builders of the Harappan culture. As’ur the deity was symbolized by a winged diSkanda The As’ur people were renowned for magic, medicine, sculpture, architecture and military prowess. (A.Banerji Sastri, The Asuras in Indo-Iranian Literature, *JBROS*, XI.1, March 1926, pp. 110-139; Asura expansion in India, *JBROS*, XII.2, June 1926, pp. 243-285; II Asura expansion by sea, *JBROS*, XII.3, Sept. 1926, pp. 334-360; V Asura Institutions, *JBROS*, XII.4, December 1926, pp. 503-539). The settlements of Assur or Asura in Magadha or South Bihar are noted. (D.R. Bhandarkar, Aryan Immigrants into Eastern India, *ABORI*, XII.2, 1931, pp. 103-116). A comprehensive survey of the texts from the R.gveda and Bra_hman.as is used to analyse the meaning of the term ‘asura’ as lord, leader and as corroborated by Iranian mythology. It is noted that the terms asura and deva are both used to qualify the same Vedic deity—for example, Indra, Varun.a, Mitra, Agni, while the Iranian works recognize ‘asura’ as divine and ‘daeva’ as demoniac. (Wash E. Hale, *Asura in Early Vedic Religion*, Ph.D. Dissertation, Harvard University, 1980; Delhi, Motilal Banarsidass, 1986). An anthropological perspective identifies the asura as a scheduled tribe of Netarhat plateau of Chotanagpur, Bihar and surveys their customs, rites, economic and social conditions. (K.K.Leuva, The Asur—*A Study of Primitive Iron Smelters*, New Delhi, Bharatiya Adimjati Sevak Sangh, 1963). Asuric culture through the ages is attempted, as a fusion of cultures. (K.P. Chattopadhyaya, *The Ancient Indian Culture Contacts and Migrations*, 1970, Calcutta, Firma KL Mukhopadhyaya). The dominance, in ancient times, of Asuras in extensive areas of Africa and Eurasia is emphasized. (K.L. Jain Vasasiya, *Indian Asuras Colonised Europe*, 1990, Delhi, Itihas Vidya Prakashan). The myths related to the Asura Bali-Va_mana, as a benevolent king and as a devotee of S’iva, is presented. (G.C. Tripathi, Der Ursprung und die Entwicklung der Vaman-Legende in der indischen Literatur, 1968, Wiesbaden, Otto Harrassowitsz). The mythology of Bali is also presented. (Clifford Hospital, *The Righteous Demon—A Study of Bali, 1984*, Vancouver, University of British Columbia). Mahis.a as a leader of Asuras in the context of the mythology of Mahis.a_suramardini is presented. In an evaluation of the genesis of the concept of Asura, it is noted the Ashur Marduk, the supreme deity of Babylonian pantheon was adopted as Ahur Mazda by the Persians after occupying Assyria.. (Upendranath Dhal, *Mahis.a_sura in Art and Thought*, 1991, Delhi, Eastern Book Linkers).

Old Indic or Proto-Bharatiya Lingua Franca or parole (spoken tongue)

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There are hundreds of lexical isolates attested in ‘Indo-Aryan’ which are not found in other branches of Indo-European. These are clearly a substratum layer of Old Indic which was spoken by the people of Bharat on the Sarasvati-Sindhu river basins and on the coastal settlements of Sindhu sa_gara (Arabian Sea). Some of these people were called Meluhhan in Mesopotamian texts. The Austroasiatic components of this substratum have to be resolved further in the context of (1) ancestors of Brahui and Elamite; and (2) other Austroasiatic groups such as those in the Brahmaputra (Lohitya)-Meghna-Barak river basins and around the Bay of Bengal.The lingua franca (or parole, spoken tongue) of Bharat circa 5000 years ago is hypothesized as a continuum of dialects, evolving in tandem with the cultural setting and technological innovations. Since the civilization which emerged on and was nurtured on the banks of Rivers Sarasvati and Sindhu continues into the historical periods in Bharat, the language spoken circa 5000 years Before Present can be reconstructed from the languages of present-day Bharat and based on the lexical work done by philologists from the days of Yaska (circa 6th century BCE) upto the discovery of Bangani in the 20th century.

"...the entire Indo-Aryan realm (except for Sinhalese) constitutes one enormous dialectical continuum...The speech of each village differs slightly from the next, without loss of mutual intelligibility, all the way from Assam to Afghanistan....Mitanni kingdom...Indo-Iranians appear in northern Syria a full half millennium becore their appearance in western Iran. How did they get there?...To call these Mitanni kings 'Indo-Iranians', however, is to beg an important question...Some have held that these linguistic fragments are specifically Indo-Aryan. Others including Burrow (1955) held they represent undifferentiated Indo-Iranian, before the split between Iranian and Indo-Aryan...An Indo-Aryan identification would demand an earlier dating of the Iranian/Indo-Aryan split; with it have also been associated speculations regarding the route taken by the Aryans to India (e.g., the Asia Minor route...), or, possibly a back migration of Aryans from India. (If the latter, the date of the Aryan settlement of India would have to be moved back far enough to allow not only for them to reach Syria by 1500 BC, but also for their language to have died out by then, leaving only the terminological residue noted...)...the philological evidence alone does not allow an Indian origin of the Aryans...there is the matter of the nature of the common vocabulary shared by Sanskrit with the rest of Indo-Europen, which points to a more northerly ultimate home...The native Dravidian vocabulary has not been reconstructed. Burrow and Emeneau's *Dravidian Etymological Dictionary* (1960) only assembles materials for it... The civilization seems to have continued peacefully in Gujarat until a comparatively late period, i.e. 800 BC (Fairservis 1975: 307), after which it dissolved into the subsequent culture, which makes that area one of prime importance in detecting any Harappan influence on Aryan language and culture." (Colin P. Masica, *The Indo-Aryan Languages*, Cambridge, Cambridge University Press, 1991).

Linguistic area, Civilization of Bha_rata, ca. 3500-1500 BCE

The following observations by Emeneau and Bloch will be tested through clusters of lexemes of an *Indian Lexicon*, which relate to the archaeological finds of the civilization. These clusters of lexemes are aids to the process of decoding the epigraphs containing both pictorials and signs as glyphs.

"In fact, promising as it has seemed to assume Dravidian membership for the Harappa_ language, it is not the only possibility. Professor W. Norman Brown has pointed out (The United States and India and Pakistan, 131-132, Cambridge, Harvard University Press, 1953) that Northwest India, i.e. the Indus Valley and adjoining parts of India, has during most of its history had Near Eastern elements in its political and cultural make-up at least as prominently as it had true Indian elements of the Gangetic and Southern types. The passage is so

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important that it is quoted in full: 'More ominous yet was another consideration. Partition now would reproduce an ancient, recurring, and sinister incompatibility between Northwest and the rest of the subcontinent, which, but for a few brief periods of uneasy cohabitation, had kept them politically apart or hostile and had rendered the subcontinent defensively weak. When an intrusive people came through the passes and established itself there, it was at first spiritually closer to the relatives it had left behind than to any group already in India. Not until it had been separated from those relatives for a fairly long period and had succeeded in pushing eastward would I loosen the external ties. In period after period this seems to have been true. In the third millennium BCE the Harappa culture in the Indus Valley was partly similar to contemporary western Asian civilizations and partly to later historic Indian culture of the Ganges Valley. In the latter part of the next millennium the earliest Aryans, living in the Punjab and composing the hymns of the Rig Veda, were apparently more like their linguistic and religious kinsmen, the Iranians, than like their eastern Indian contemporaries. In the middle of the next millennium the Persian Achaemenians for two centuries held the Northwest as satrapies. After Alexander had invaded India (327/6-325 BCE) and Hellenism had arise, the Northwest too was Hellenized, and once more was partly Indian and partly western. And after Islam entered India, the Northwest again was associated with Persia, Bokhara, Central Asia, rather than with India, and considered itself Islamic first and Indian second. The periods during which the Punjab has been culturally assimilated to the rest of northern India are ew if any at all. Periods of political assimilation are almost as few; perhaps a part of the fourth and third centuries BCE under the Mauryas; possibly a brief period under the Indo-Greek king menander in the second century BCE; another brief period under the Muslim kingdom of Delhi in the last quarter of the twelfth century A.D.; a long one under the great Mughals in the sixteenth and seventeenth centuries A.D.; a century under the British, 1849-1947.'

"Though this refers to cultural and political factors, it is a warning that we must not leap to linguistic conclusions hastily. The early, but probably centuries-long condition in which Sanskrit, a close ally of languages of Iran, was restricted to the northwest (though it was not the only language there) and the rest of India was not Sanskritic in speech, may well have been mirrored earlier by a period when some other language invader from the Near East-a relative of Sumerian or of Elamitic or what not-was spoken and written in the Indus Valley-perhaps that of invaders and conquerors-while the indigenous population spoke another language-perhaps one of the Dravidian stock, or perhaps one of the Munda stock, which is now represented only by a handful of languages in the backwoods of Central India.

"On leaving this highly speculative question, we can move on to an examination of the Sanskrit records, and we find in them linguistic evidence of contacts between the Sanskrit-speaking invaders and the other linguistic groups within India...

"...the early days of Indo-European scholarship were without benefit of the spectacular archaeological discoveries that were later to be made in the Mediterranean area, Mesopotamia and the Indus Valley... This assumption (that IE languages were urbanized bearers of a high civilization) led in the long run to another block-the methodological tendency of the end of the nineteenth and the beginning of the twentieth century to attempt to find Indo-European etymologies for the greatest possible portion of the vocabularies of the Indo-European languages, even though the object could only be achieved by flights of phonological and semantic fancy... very few scholars attempted to identify borrowings from Dravidian into Sanskrit...The Sanskrit etymological dictionary of Uhlenbrck (1898-1899) and the Indo-European etymological dictionary of Walde and Pokorny (1930-1932) completely ignore the work of Gundert (1869), Kittel (1872, 1894), and Caldwell (1856,1875)... It is clear that not all of Burrow's suggested borrowings will stand the test even of his own principles..." [M.B.Emeneau, India as a Linguistic Area [Lang. 32, 1956, 3-16; *LICS*, 196, 642-51; repr. In Collected papers: *Dravidian Linguistics Ethnology and Folktales*, Annamalai Nagar, Annamalai University, 1967, pp. 171-186].

Language X, Nahali, Vedic

A remarkable clue is provided by the existence of Nahali as an isolate language in the Narmada Valley, a valley which has assumed prominence as a neolithic precursor (ca. 10000 years Before

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Present) of the bronze-age civilization on the Sarasvati Sindhu River valleys. Was Nahali an Austro-asiatic language; or was it an Indo-European language? The vocabulary of Nahali[iv] contains a number of words which may be interpreted as the Indo-Aryan substratum. The Gulf of Khambat Cultural Complex (GKCC) close to the area of the Nahali-speakers is only 300 kms. from Padri, Dholavira and Surkotada which are replete with stone structures; in Dholavira, ringstones and polished pillars of stone have been found. A maritime, riverine culture of the GKCC parallels the land-based, riverine, Mehrgarh neolithic evidence.

Northwest Coast of Bharat; Ozene regia (Ujjain, the capital), upper right; Namadus flu (Narmada River), lower center; Barigaza emporium (Broach), lower left; the dotted boundary line includes the whole Narmada Valley and the principal port of Malwa state at Broach. [Ptolemy's map]

Close to the Gulf of Khambat Cultural Complex where two submerged rivers have been discovered (possible extensions of palaeo-channels of River Tapti) are the speakers of Nahali language which is described as an Indo-Aryan language.
http://www.hindunet.org/saraswati/khambat/khambat01.htm

The glyphs of the civilization are abiding records of such metaphors, glyphs such as the svastika_, the dotted-circle, the endless knot, the branches of a tree or twigs from a branch, the horns. The glyphs are an artisan's way of representing meaning, representing life-activities unraveling the nature of material phenomena – of the minerals which could be moulded into metals and artifacts of a civilization.

Cracking the code

This metaphor as the communication medium is succinctly expressed by a great grammarian, Tolka_ppiyan in Tamil: **ella_ccollum porul. kur-ittan-ave** (all words are semantic indicators). (*Tol. Col. Peya.* 1)

For each morpheme conveyed by a pictorial motif, a similar sounding 'substantive' morpheme (homonym) will be identified. The formula in this rebus methodology is:

Image = Sound = Meaning

Rebus (Latin: 'by means of things') is a graphemic expression of the phonetic shape of a word or syllable. Rebus uses words pronounced alike (homophones) but with different meanings. Sumerian script was phonetized using the rebus principle. So were the Egyptian heiroglyphs based on the rebus principle.

The rebus system of writing, thus, is governed by the organizing principle: **all glyphs are phonetic indicators or phonetic determinants**.

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Thus over 1,0000 glyphs represented on epigraphs of the civilization are semantic indicators. These are heiroglyphs governed by a concordance: image = sound = meaning. A glyph evokes an associated sound; the sound evokes a meaning. This can be illustrated by the splendid glyph of the Bra_hman.i or Zebu bull.

In Santali, the glyph of the Zebu bull evokes a sound: **adar**, **adar d.an:gra** In Kashmiri **d.an:gur** = bullock.

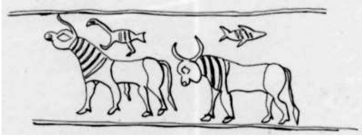
In Sanskrit, a tree evokes a sound: dru Cognate words in the linguistic area of Bharat, the dialectial continuum are: ad.aru = twig (Kannada. Tulu). Such a glyph can be ligatured, as a headdress, to a glyph of a standing or seated person ligatured to the back of a bull (adar), as a phonetic determinant. d.hagara_m = n.pl. the buttocks; the hips (G.) Or, as a person carrying a club: d.an:gorum, d.an:go, d.an:goro = a thick club; a cudgel (G.lex.)

Even a mere splinter can, as a glyph-- **"**--represent this sound: **at.ar** = a splinter (Ma.); **ad.aruni** = to crack (Tu.) which is rebus (sounds like) **aduru** 'native metal' (Ka.) **aduru = gan.iyinda tegadu karagade iruva aduru = ore taken from the mine and not subjected to melting in a furnace** (Ka. Siddha_nti Subrahman.ya' S'astri's new interpretation of the Amarakos'a, Bangalore, Vicaradarpana Press, 1872, p. 330); adar = fine sand (Ta.); adaru = a sparkle (Te.); ayir – iron dust, any ore (Ma.)

A zebu bull tied to a post; a bird above. Large painted storage jar discovered in burned rooms at Nausharo, ca. 2600 to 2500 BCE. Cf. Fig. 2.18, J.M. Kenoyer, 1998, Cat. No. 8.

The zebu is: **ad.ar d.an:gra** (Santali)

This brahman.i bull or zebu is orthographically distinguished from other bulls: one, a hypher, the other an ox.



Tell Suleimeh (level IV), Iraq; IM 87798; (al-Gailani Werr, 1983, p. 49 No. 7). A fish over a short-horned bull and a bird over a one-horned bull; cylinder seal impression, (Akkadian to early Old Babylonian). Gypsum. 2.6 cm. Long 1.6 cm. Dia. [Drawing by Larnia Al-Gailani Werr. Cf. Dominique Collon 1987, *First impressions: cylinder seals in the ancient Near East*, London: 143, no. 609]

bat.a = a quail, or snipe, coturuix coturnix cot; bon.d.e bat.a = a large quail; dak bat.a = the painted stripe, rostraluta benghalensis bengh; gun.d.ri bat.a = a small type, coloured like a gun.d.ri (quail); ku~k bat.a = a medium-sized type; khed.ra bat.a = the smallest of all; lan.d.ha bat.a = a small type (Santali.lex.) **bat.ai**, (Nag.); bat.er (Has.); [H. bat.ai or bat.er perdix olivacea; Sad. bat.ai] coturnix coromandelica, the black-breasted or rain-quail; two other kinds of quail are called respectigely: hur.in bat.ai and gerea bat.ai (Mundari.lex.) vartaka = a duck (Skt.) batak = a duck (G.lex.) vartika_ = quail (RV.); wuwrc partridge (Ash.); barti = quail, partridge (Kho.); vat.t.aka_ quail (Pali); vat.t.aya (Pkt.); bat.t.ai (N.)(CDIAL 11361). **varta** = *circular object; *turning round (Skt.); vat.u = twist (S.)(CDIAL 11346) bat.er = quail (Ku.B.); bat.ara, batara = the grey quail (Or.)(CDIAL 11350).

bat.a; rebus, **bat.a** 'iron'

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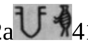
h452a4124 (bird + rimmed jar) Is it an egret?

bat.a = **a quail or snipe, *coturnis colurnix* (Santali)**

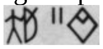
bat.ai = to divide, share (Santali) [Note the glyphs of nine rectangles divided.]

Furnace or kiln, native metal, zebu bull

bat.a = quail (Santali) Rebus: **bhat.a** = furnace, kiln (Santali).

In Kannada, another language in a dialectical continuum of Bharatiya language spectrum of over 5000 years ago, the sound associated with the Zebu bull glyph evokes a meaning from a cognate sound: **aduru** = native metal, i.e. a metal which is not subjected to smelting or melting in fire. In almost all languages of Bharat, the sound d.han:gar evokes a meaning, **d.han:gar** 'blacksmith' (WPah.); **d.a_n:ro** = term of contempt for a blacksmith (N.); **t.ha_kur** 'blacksmith' (Mth.) **dha~_gar** = a professional group whose business it is to dig wells, tanks etc. (H.)

Glyphs: animal in heat and trampling upon a long necked person (?)

It is seen from an enlargement of the bottom portion of the seal impression that the 'prostrate person' may not be a person but a ligature of the neck of an antelope with rings on its necks or of a post with ring-stones. The head of the 'person' is not shown. So, it may be surmised that this is an artist's representation of an act of copulation (by an animal) + a ligatured neck of another bovine or alternatively, a pillar with ring-stones ligatured to the bottom portion of a body (perhaps of a cow, why not?). It is not uncommon in the artistic tradition to ligature bodies to the rump of, for example, a bull's posterior ligatured to a horned woman (Pict. 103 Mahadevan) or standing person with horns and bovine features (hoofed legs and/or tail) -- Pict. 86-88 Mahadevan. Bison (gaur) trampling a prostrate person (?) underneath. Impression of a seal from Chanhujodaro (Mackay 1943: pl. 51: 13). The prostrate 'person' is seen to have a very long neck, possibly with neck-rings, reminiscent of the rings depicted on the neck of the one-horned bull normally depicted in front of a standard device.  6114

The pictorial motif on this Chanhudaro seal is compared with a pictorial motif on a Margiana stamp seal using line-drawings:

Left. Margiana, stamp seal: obverse, attacking lion; reverse: a bull copulating with a woman. ; Right: Chanhujo-daro seal: the bull is leaning over a lying woman with opened legs (Mackay, 1943, pl. 51: 13).

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Tosi notes the occurrence of Harappan steatite seals and etched carnelian beads at 'Bactrian sites', materials which were found in the 'looted graveyards of Bactria'. (Tosi, M., 1979, The proto-urban cultures of eastern Iran and the Indus civilization', in in M. Taddei (ed.) *South Asian Archaeology* 1977, II. Naples: 643-59; Francfort, H.P., 1984, The Harappan settlement of Shortughai, in B.B. Lal and S.P. Gupta, eds., *Frontiers of the Indus Civilization*, Delhi, 301-10.)

The prostrate 'person' pictograph is comparable to the 'scorpion' glyph, ligatured to a lanky woman, shown at the bottom register of a Failaka seal. Obverse of steatite Dilmun stamp seal from Failaka Island (c. 2000 BCE).

d.han:ga = tall, long shanked; *maran: d.han:gi aimai kanae* = she is a big tall woman (Santali.lex.) Rebus: **d.han:gar** 'blacksmith'

Obverse of steatite Dilmun stamp seal from Failaka Island (c. 2000 BCE). A human figure and a variety of animals – two antelopes one with its head looking backward; possibly a scorpion at the feet of the human figure. A dotted circle is seen above one antelope and a vase in between the antelope and the human figure. Kuwait National Museum. French Archaeological Expedition in Kuwait. Several inscriptions at Failaka mention the Dilmunite god Enzak and his temple or Mesopotamian deities. [Remi Boucharlat, Archaeology and Artifacts of the Arabian Peninsula, in: Jack M. Sasson (ed.), *Civilizations of the Ancient Near East*, pp. 1335-1353].

Glyph: field symbol: **kulai** = hare (Santali)

When a phoneme evokes more than one image, the artist who creates the glyptic representations uses ligatures. Thus, **ko_la** = woman (Nahali) **kol** = tiger (Santali). The representation in glyptic are yields a ligature of a woman and a tiger.

It appears that the person holding back the two rearing jackals on the tablet is a woman: **ko_l** 'woman' (Nahali); dual. **ko_lhilt.el** (Sudhibhushan Bhattacharya, Field-notes on Nahali, *Ind. Ling.* 17, 1957, p. 247); kola = bride, son's (younger brother's) wife (Kui) **ko_l** is a phonetic determinative of the two jackals, **kol** 'tiger'; rebus: **kol** 'metal' (Ta.)

The decoding of 'woman' glyph on the tablet as a phonetic determinative of **kol** 'tiger' gains surprising validation from a ligatured terracotta image of a feline tiger with a woman's face and headdress..

Feline figurine terracotta. A woman's face and headdress are shown. The base has a hole to display it on a stick. (After JM Kenoyer/Courtesy Dept. of Archaeology and Museums, Govt. of Pakistan).

The phonemes and the associated glyph evoke a meaning: **kol** 'metal' (Ta.) kola = blacksmith (Ma.); kol, kollan- (Ta.); kolime, **kulime**, kolume = a fire-pit or furnace (Ka.); kolime id., a pit (Te.); kulume kanda_ya = a tax on blacksmiths (Ka.) kolimi titti = bellows used for a furnace (Te.)

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There is a lexeme which connotes *pan~caloha*, an alloy containing five metals:: **kol** This word is represented *rebus* (lit. sounds like) by a tiger, **kolhu-o** (G.)

kol = *pan~calo_kam* (five metals); **kol** metal (Ta.lex.) **pan~caloha** = a metallic alloy containing five metals: copper, brass, tin, lead and iron (Skt.); an alternative list of five metals: gold, silver, copper, tin (lead), and iron (dha_tu; Na_na_rtharatna_kara. 82; Man:gara_ja's Nighan.t.u. 498)(Ka.) *kol*, *kolhe*, 'the koles, an aboriginal tribe if iron smelters speaking a language akin to that of Santals' (Santali) **kol** = kollan-, kamma_l.an- (blacksmith or smith in general)(Ta.lex.) kollar = those who guard the treasure (Ta.lex.) cf. golla (Telugu) **khol, kholi_** = a metal covering; a loose covering of metal or cloth (G.) [The semant. expansions to kolla_puri or kolha_pur and also to '**kolla_ppan.t.i**' a type of cart have to be investigated further].

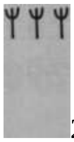
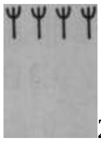
kol 'working in iron, blacksmith (Ta.); *kollan*- blacksmith (Ta.); *kollan* blacksmith, artificer (Ma.)(DEDR 2133)

kolime, kolume, kulame, kulime, kulume, kulme fire-pit, furnace (Ka.); kolimi furnace (Te.); pit (Te.); **kolame** a very deep pit (Tu.); kulume kanda_ya a tax on blacksmiths (Ka.); **kol, kolla** a furnace (Ta.) *kole.l* smithy, temple in Kota village (Ko.); *kwala.l* Kota smithy (To.); *konimi* blacksmith; *kola* id. (Ka.); *kolle* blacksmith (Kod.); *kollusa_na_* to mend implements; *kolsta_na, kulsa_na_* to forge; *ko_lsta_na_* to repair (of plough-shares); *kolmi* smithy (Go.); *kolhali* to forge (Go.)(DEDR 2133).] **kolimi-titti** = bellows used for a furnace (Te.lex.) **kollu-** to neutralize metallic properties by oxidation (Ta.lex.) **kol** brass or iron bar nailed across a door or gate; kollu-t-tat.i-y-a_n.i large nail for studding doors or gates to add to their strength (Ta.lex.) **kollan--kamma_lai** < + karmas'a_la_, kollan--pat.t.arai, kollan-ulai-k-ku_t.am blacksmith's workshop, smithy (Ta.lex.) cf. ulai smith's forge or furnace (Na_lat.i, 298); ulai-k-kal.am smith's forge; ulai-k-kur-at.u smith's tongs; ulai-t-turutti smith's bellows; ulai-y-a_n.i-k-ko_l smith's poker, beak-iron (Ta.lex.) [**kollulaive_r-kan.alla_r: nait.ata. na_t.t.up.); mitiyulaikkollan- mur-iot.ir.r.an-n-a: perumpa_**)(Ta.lex.) Temple; smithy: kol-l-ulai blacksmith's forge (kollulaik ku_t.attin-a_l : Kumara. Pira. Ni_tiner-i. 14)(Ta.lex.) cf. kolhua_r sugarcane milkl and boiling house (Bi.); kolha_r oil factory (P.)(CDIAL 3537). *kulhu* 'a hindu caste, mostly oilmen' (Santali) kolsa_r = sugarcane mill and boiling house (Bi.)(CDIAL 3538).

kola_ burning charcoal (L.P.); ko_ila_ burning charcoal (L.P.N.); id. (Or.H.Mth.), kolla burning charcoal (Pkt.); koilo dead coal (S.); kwelo charcoal (Ku.); kayala_ charcoal (B.); koela_ id. (Bi.); koilo (Marw.); koyalo (G.)(CDIAL 3484). < Proto-Munda. ko(y)ila = kuila black (Santali): all NIA forms may rest on ko_illa.] koela, kuila charcoal; khaura to become charcoal; ker.e to prepare charcoal (Santali.lex.)

Grapheme: **ko_lemu** = the backbone (Te.)

kolma = a paddy plant (Santali) Rebus: **kolime**= furnace (Ka.)


2949 Dotted circles

2950

Rojdi

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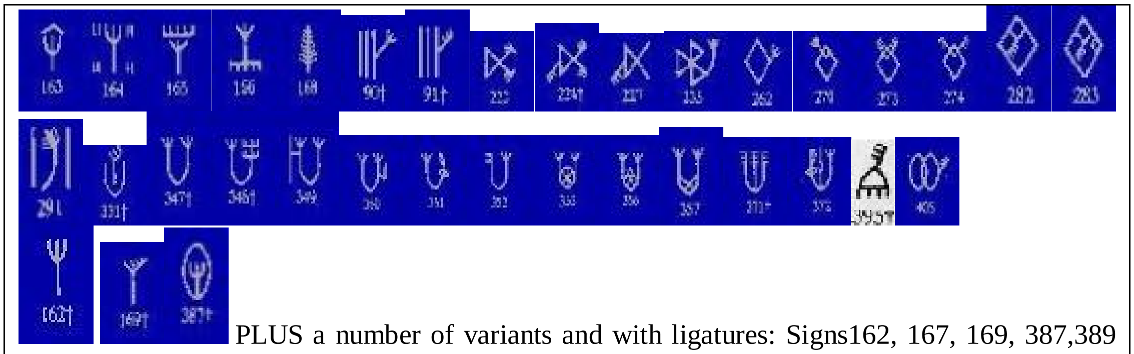

PLUS a number of variants and with ligatures: Signs162, 167, 169, 387,389 +variants; Ligatures: Signs163, 166-6, 168, 90, 91,223,224,227,235.262,270,273,274, 282,283,291,331, 347-352, 355-357,371,372, 388-390,395,405

kolom = cutting, graft; to graft, engraft, prune; kolom dare kana = it is a grafted tree; kolom ul = grafted mango; kolom gocena = the cutting has died; kolom kat.hi hor.o = a certain variety of the paddy plant (Santali); kolom (B.); kolom mit = to engraft; kolom porena = the cutting has struck root; kolom kat.hi = a reed pen (Santali.lex.) cf. kolom = a reed, a reed-pen (B.); qalam (Assamese.Hindi); **kolma hor.o** = a variety of the paddy plant (Desi)(Santali.lex.Bodding) kolom baba = the threshed or unthreshed paddy on the threshing floor; kolom-ba_rum = the weight a man carries in taking the paddy from the threshing floor to his house; kolom = a threshing floor (Mundari); cf. kal.am (Tamil) [Note the twig adoring the head-dress of a horned, standing person]

ku_l.e stump (Ka.) [ku_li = paddy (Pe.)] xo_l = rice-sheaf (Kur.) ko_li = stubble of jo_l.a (Ka.); ko_r.a = sprout (Kui.) **ko_le** = a stub or stump of corn (Te.)(DEDR 2242). kol.ake, kol.ke, the third crop of rice (Ka.); kolake, kol.ake (Tu.)(DEDR 2154) [kural = corn-ear (Ta.)]

V267 Sign 261 **kan-** copper work, copper (Ta.)

kana kona = corner (Santali) [Glyphs of **corner + splinter** shown on the first line of the epigraph on the gold pendant, may thus connote: worker in copper.]

cu_d.a = tiger's mane (Pkt.) **cu_r.a_** = bracelet (Go.); **cu_d.a** = bracelet (Skt.Pkt.) These sounds result in the construction of an image by the artist. He creates a person adorned with bracelets with the face composed of tiger's mane. These glyphs and associated phonemes evoke a meaning: **cul.l.ai** = potter's kiln, furnace (Ta.); **culli_** = fireplace (Skt.); **culli_, ulli_** id. (Pkt.)

The meaning conveyed by penance itself can be composed as a glyph: a person seated in a yogic posture. **kamad.ha, kamat.ha** = a type of penance (Pkt.). This word can also be imaged like a ficus leaf,: **kamat.ha** (Skt.) or a bat**, kabat.a** (Ka.)

This sound of this word evokes meanings related to tools of trade of a professional artisan : **kamat.a** = a portable furnace for melting precious metals (Te.) **kamat.ha_yo** = a learned carpenter or mason, working on scientific principles (G.) **kammat.i_d.u** = a goldsmith, a silversmith (Te.) **kampat.t.am** = mint (Ta.)

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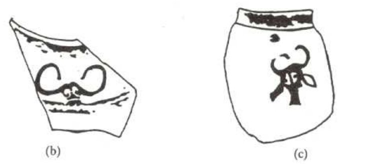
Sign 28 Ligature on sign 28: dhanus ‘bow’ (Skt.) dhan.i_ = the owner, the possessor (G.)

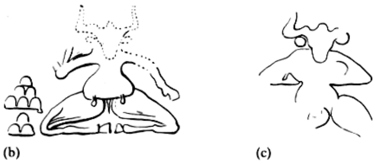
kamat.amu, kammat.amu = **a portable furnace for melting precious metals;** kammat.i_d.u = **a goldsmith, a silversmith (Te.lex.)** ka~pr.aut., kapr.aut. **jeweller's crucible made of rags and clay (Bi.); kapr.aut.i_ wrapping in cloth with wet clay for firing chemicals or drugs, mud cement (H.)[cf. modern compounds: kapar.mit.t.i_ wrapping in cloth and clay (H.); kapad.lep id. (H.)](CDIAL 2874).** kapar-mat.t.i **clay and cowdung smeared on a crucible (N.)(CDIAL 2871).**

kampat.t.tam **coinage, coin (Ta.);** kammat.t.am, kammit.t.am **coinage, mint (Ma.);** kammat.i **a coiner (Ka.)(DEDR 1236)** kammat.a = **coinage, mint (Ka.M.)** kampat.t.a-k-ku_t.am **mint;** kampat.t.a-k-ka_ran- **coiner;** kampat.t.a- mul.ai **die, coining stamp (Ta.lex.)**

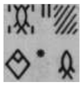
Glyph: kamad.ha, kamat.ha, kamad.haka, kamad.haga, kamad.haya = **a type of penance (Pkt.lex.)**



Buffalo's horns. Gumla, NW Frontier province. After Sankalia 1974: 354, fig. 88: b (=b), c (=c)



Buffaloes sitting with legs bent in yogic a_sana. Susa Cc-Da, ca. 3000-2750 BC, proto-Elamite seals: (a-c) After Amiet 1972: pl. 25, no. 1017 (=a); and Amiet 1980a: pl. 38, nos. 581-2 (b-c)

m0305AC  2235 Pict-80: Three-faced, horned person (with a three-leaved pipal branch on the crown with two stars on either side), wearing bangles and armlets. Two stars adorn the curved buffalo horns of the seated person **with a plaited pigtail**. The pigtail connotes a pit furnace:

Substantive: *sund* ‘pit (furnace)’; *sum, sumbh* a mine, a pit, the opening into a mine, the shaft of a mine; sum bhugak the entrance to a mine, pit’s mouth (Santali). *sun.d.i* a semi-hinduised aboriginal caste; this caste are the distillers and liquor sellers; *sun.d.i gadi* a liquor shop (Santali) *cun.d.* to boil away (Ko.); *sun.d.u* to evaporate (Ka.); *cun.d.u* to be evaporated or dried up (Te.); *s’un.t.hi* to become dry (Skt.)(DED 2662).

Glyph: *su_nd gat.* knot of hair at back (Go.); *cundi_* the hairtail as worn by men (Kur.)(DEDR 2670).

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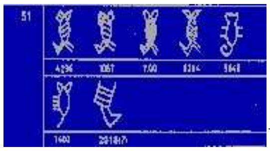
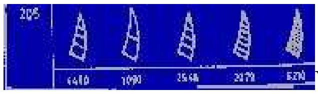
V051 Sign 51 might have been normalised from an early variant which depicts a mouse or rat seen from the back. There could be two glyphs involved: one, that of **kaca** 'scorpion'; rebus: **kacc** 'iron' and the second, that of rat **sun.d.a**; rebus: **sun.d.** 'pit furnace'. **sun.d.a** musk-rat (Ka.)(DEDR 2661)]. **s'un.d.i**-mu_s.ika_, s'un.d.a-mu_s.ika_ musk-rat (Skt.)(CDIAL 12517).

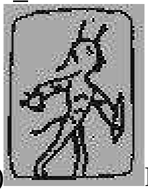
V205 Sign 205 and variants: **son.d.a** = a tusk, as of wild boar, elephant (Santali.lex.) **sonda** = a billhook, for cutting fire wood (Santali.lex.)

Griffin, Baluchistan (Provenance unknown); ficus leaves, tiger, with a wing, ligatured to an eagle.

eru_, aru = eagle (Akkadian/Assyrian) **eruvai** = a kind of kite whose head is white and whose body is brown; eagle (Ta.); **eruva** = eagle, kite (Ma.)(DEDR 819).

aru_ = lion (As god of devastation, Nergal is called A-ri-a) (Akkadian)

aba_ru = lead; antimony (**annaku** is most unlikely to be lead rather than tin).(cf. CAD A (II): 126; AHw 49) (Akkadian/Assyrian).
abru = wing (Akkadian/Assyrian)

Glyph: **kama_t.hiyo** = archer; **ka_mat.hum** = a bow; ka_mad.i_, ka_mad.um = a chip of bamboo (G.) **ka_mat.hiyo** a bowman; an archer (Skt.lex.) Copper tablets (15)Field Symbol 52

kamar.kom = fig leaf (Santali.lex.) **kamarmar.a_** (Has.), **kamar.kom** (Nag.); the petiole or stalk of a leaf (Mundari.lex.)

There is a lexeme which connotes *pan~caloha,* an alloy containing five metals:: **kol** This word is represented *rebus* (lit. sounds like) by a tiger, **kolhu-o** (G.)

kol = *pan~calo_kam* (five metals); **kol** metal (Ta.lex.) **pan~caloha** = a metallic alloy containing five metals: copper, brass, tin, lead and iron (Skt.); an alternative list of five metals: gold, silver, copper, tin (lead), and iron (dha_tu; Na_na_rtharatna_kara. 82; Man:gara_ja's Nighan.t.u. 498)(Ka.)

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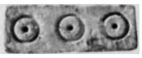
kol, kolhe, ‘the koles, an aboriginal tribe if iron smelters speaking a language akin to that of Santals’ (Santali) **kol** = kollan-, kamma_l.an- (blacksmith or smith in general)(Ta.lex.) kollar = those who guard the treasure (Ta.lex.) cf. golla (Telugu) **khol, kholi_** = a metal covering; a loose covering of metal or cloth (G.) [The semant. expansions to kolla_puri or kolha_pur and also to '**kolla_ppan.t.i**' a type of cart have to be investigated further].

kol ‘working in iron, blacksmith (Ta.); *kollan*- blacksmith (Ta.); *kollan* blacksmith, artificer (Ma.)(DEDR 2133)

V267 Sign 261 **kan-** copper work, copper (Ta.)

kana kona = corner (Santali) [Glyphs of **corner + splinter** shown on the first line of the epigraph on the gold pendant, may thus connote: worker in copper.]

 h352C Dotted circles.

tamar = hole in a plank, commonly bored or cut; gimlet, spring awl, boring instrument; tavar = to bore, a hole; hole in a board (Ta.); tamar = hole made by a gimlet; a borer, gimlet, drill (Ma.); tamire, tagire = the pin in the middle of a yoke (Te.); tamiru = gimlet (Tu.)(DEDR 3078).

tavaru, tavara, trapu, tavarinadu, **tagara**, **tamara** = tin, tra_pus.a (Ka.); tavaramu, tamaramu (Te.); tamara = tagara = tin, lead; trapu = id. (Ka.) trapulamu, trapuvu = tin; lead (Te.)

Priest: **tammad.a, tammad.i** = an attendant on an idol (Ka.); tammal.ava_d.u, tammal.i, tammad.i, tammali, **tambal.ava_d.u** (Te.) Rebus: **tamba** = copper (Santali) **tamire** = hole; **t.ebra** = three (cf. glyph of trefoil inlaid on the uttari_yam – upper garment); Rebus: **tamara** = tin (Ka.) **tibira** = merchant (Akkadian)

Use of the glyph continues into historical periods. **Sealing with the device of six nandipada-s around a circle enclosing a dot,** Sankisa, Dept. of AIH and Arch., Lucknow University. Device: dotted circle. [After Pl. XXXII,10 in Thaplyal, 1972]

Sign 176 (355) Glyph: comb **kangha** (IL 1333) ka~ghera_ comb-maker (H.)

Rebus: **kan:g** = brazier, fireplace (K.)(IL 1332) Portable brazier **ka~_guru, ka~_gar** (Ka.) whence, large brazier = **kan:gar** (K.)

Bet Dwarka Inscription on a jar [After Pl. XLIX in SR Rao]

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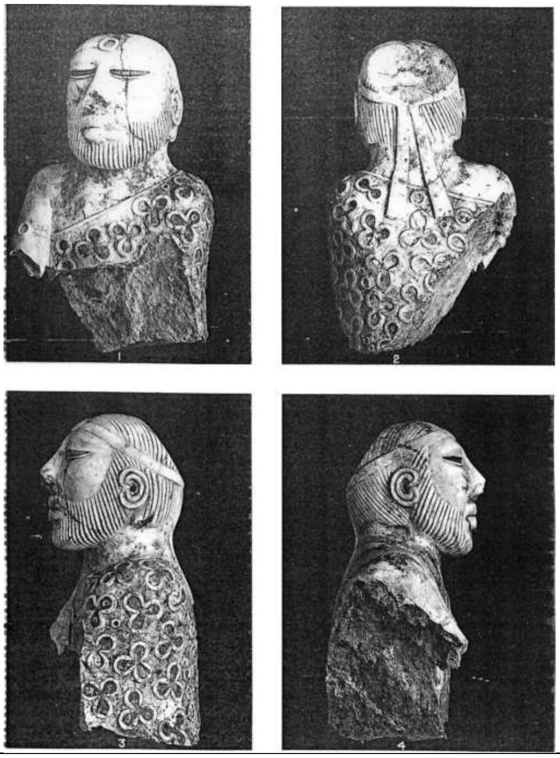
MS5065 Pakistan, ca. 1800 BCE MS Indus Valley language on copper, Mohenjo-Daro, Indus Valley, ca. 1800 BC, 1 square stamp seal matrix, 1,3x1,3x0,9 cm, 3 Indus valley signs in script *Provenance:* 1. Found in Mohenjo-Daro (ca. 1950-1970); 2. The Waria Collection, Dadu, Pakistan (-2001). *Commentary:* There is only one similar seal known, from Lothal (L-44).



Statuette showing a priest wearing uttari_yam, upper garment, leaving the right-shoulder bare. The garment has trefoil motif as on a stone pedestal used perhaps to mount a s'iva lingam.

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Seated male figure with head missing (45, 46). On the back of the figure, the hair style can be partially reconstructed by a wide swath of hair and a braided lock of hair or ribbon hanging along the right side of the back.

A cloak is draped over the edge of the left shoulder and covers the folded legs and lower body, leaving the right shoulder and chest bare. The left arm is clasping the left knee and the hand is visible peeking out from underneath the cloak. The right hand is resting on the right knee which is folded beneath the body.

Material: limestone **Dimensions:** 28 cm height, 22 cm width Mohenjo-daro, L 950 **Islamabad Museum** Marshall 1931:358-9, pl. C,

Metaphors as semantic indicators: the sacred is the secular

In GK Chesterton's *Father Brown*, the detective makes a perceptive observation: somehow, nobody notices a postman who quietly enters into a house, commits a murder and walks away; somehow, nobody notices a postman. This metaphor is apt in describing an attempt to unravel the language(s) of Bharat circa 5000 years ago spoken on the banks of Rivers Sarasvati and Sindhu. The postman, the language is **mleccha**! the lingua franca, the parole. Pre-history has not vanished, it is all around us. Using the epigraphs of Sarasvati civilization, it is possible to unravel the attributes of both the message and the messenger and relate them to archaeology and continuing tradition in Bharat.

Sarasvati is a metaphor adored in ecstatic terms in **brahma**, the prayer invoked in over 70 **r.ca-**s of *R.gveda*. She is a mother, a divinity. She is reality, she is **nadi_,** river of the **saptasindhu** or region of seven rivers; she nurtured a civilzation on her banks. She is Bra_hmi, the glyptic representation of parole (**bha_s.a_**). She is va_k (parole); she is **jn~a_na devi** (wisdom divinity).
Metaphor is an exquisite and powerful tool of general semantics.

The central theses presented in the saptathi S*arasvati*, are that in comprehending reality, metaphor is a powerful poetic, artistic medium which bursts forth in a **r.ca** or **su_kta** or a glyptic representation called **mlecchita vikalpa** (cipher writing). *R.gveda*, which is perhaps the oldest human document,

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which has been handed down as a heritage, with astonishing phonetic fidelity, like a tape recorder preserved and passed on from generation to generation, abounds in metaphors. The task of a seeker is to unravel the reality from the web (ni_d.am) of metaphors. The epigraphs of the civilization are composed of glyphs as metaphors. So are many sculpted mu_rti-s metaphors. Stone s'iva lin:ga found in Harappa and terracotta representations of lin:ga found in Kalibangan are metaphors, representing the shape of the summit of Mt. Kailas. The a_gama tradition of Bharat cherishes a metaphor of S'iva who sits in penance on the summit of Mt. Kailas. His consort is Pa_rvati, parvata putri_, daughter of the mountain. The mountain, the mighty Himalayan ranges – devata_tma_ himalaya according to the poet Ka_l.ida_sa -- is a reservoir, a veritable water tower holding life-sustaining, sacred waters, **a_pah**. As S'iva sits in penance, River Ganga emerges from the locks of his hair. It is a metaphor representing the flows of waters and alluvium into the plains of Bharat, sustaining a civilization.

In the unique **a_gama** tradition of Bharat, **a_yudha_ni** carried by **mu_rti**-s sculpted by artisans, the **vis'vakarma**, are metaphors of the attributes of divinity which permeates every phenomenon. Life itself is a metaphor, a quest for understanding **r.ta**, the cosmic order and **dharma**, which holds this order together. Everything secular is enveloped in spirituality. There is no reality but the spiritual metaphor. The R.gvedic **yajn~a** is a metaphor. It is a representation of the reality of unity of cosmic and individual consciousness.

The Meluhhan being introduced carries an antelope on his arm. Cylinder seal Impression. Akkadian. Inscription records that it belongs to '*S'u-ilis'u, Meluhha interpreter*'. Musee du Louvre. Ao 22 310, Collection De Clercq.

It appears that the 'antelope' or 'ram' shown on the back of the Meluhhan is a homonym for a semantic determinant connoting the nature of his profession, the helper of a merchant. This interpretation is surmised from two elamite artifacts -- the silver and gold statues of an Elamite king carrying a zebu bull.

The Elamite is announcing himself as: **ku_t.a**, 'chief'; **khu~t.,** 'bra_hman.i (zebu) bull'. On a silver statue, he carries a short-horned bull; on a gold statue, he carries a zebu bull. The short-horned bull is **homa** 'bison'; rebus: **soma** 'electrum'. The zebu is: **adar d.an:gra**; rebus: **adaru** 'native metal, panned gold' **d.an:gra, t.hakkura** 'blacksmith, chief".

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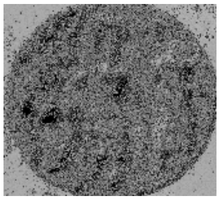
Elamite king, gold and silver statuette 12 Century BC, **3" high** discovered 1904 by archaeologist Roland *de* Mecquenem at Susa's (shoush) acropolis.

So, what is the Meluhhan shown on the cylinder seal doing? He is selling copper and perhaps also other minerals, metals and metal products of the warehouse (**ma_n.d.a_**: Kon:kan.i) of braziers from Meluhha.

me_n.d.ha = ram (Skt.)(CDIAL 10310). me_l.h goat (without etymology)(Brahui); mr..e_ka (unknown meaning)(Te.); me_~ka = goat (Te.)(DEDR 5087). Rebus: **med.** 'iron' (Mundari)

Melukka, copper; melh, goat

On some glyphs, the antelope is held by its neck (**med.a** or **melkha_**):



urseal8Seal; BM 118704; U. 6020; Gadd PBA 18 (1932), pp. 9-10, pl. II, no.8; two figures carry between them a vase, and one presents a goat-like animal (not an antelope) which he holds by the neck. Human figures wear early Sumerian garments of fleece.

melkha_ throat, neck (Kur.); melque throat (Malt.)(DEDR 5080). This glyph of holding by the throat of the animal is a phonetic determinant of the animal itself: **me_lh** goat (Br.); mr..e_ka (Te.); meque to bleat (Malt.); me_ke she-goat (Ka.); goat (Nk.) me~_ka, me_ka goat (Te.); me.ke (Kol.); me_ge goat (Ga.); meka_, me_ka (Go.); me_xna_ to call, hail (Kur.)(DEDR 5087). **med.a** = neck (Te.lex.) met.e = the throat (Ka.); men-n.a, men-n-i (Ta.); menne (Ma.);

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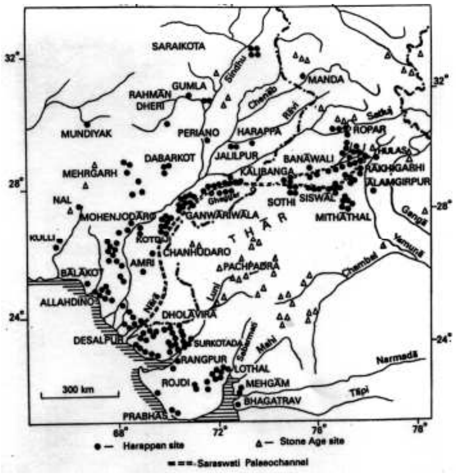
mid.ar-u = the neck, the throat (Ta.Ma.); met.regat.t.u = a swelling of the glands of the throat (Ka.lex.) [The dotted circle connoting the eye: **khan:gar** 'full of holes'; rebus: **kan:gar** 'furnace']

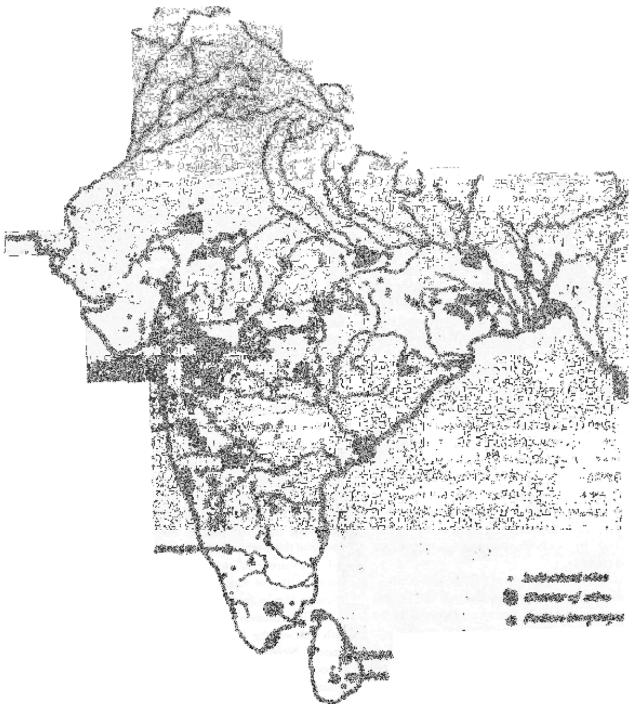
This is rebus for: **melukka** copper (Pali) [cf.Meluhhan interpreter shown on a cylinder seal; the Meluhhan is shown carrying a goat on his hands.]

Melukkha (milakkhu, 'copper': Pali)! **met.ari**, hero, warrior, eminent person, merchant's clerk. mehto [Hem. Des. med.ho = Skt. Van.ik saha_ya, a merchant's clerk, fr. mahita, praised, great] a schoolmaster; an accountant; a clerk; a writer (G.lex.)

There are thousands of microlithic sites in India and neighbouring regions and the areas of the substrate languages of Naha_li, Irul.a, Vedda and Rodiya It is likely that many lexemes of the Pra_kr.ts were derived from the hundreds of such languages which should have constituted the substratum of the Linguistic Area in Indic protohistory.

Rigveda refers to daks.in.a_pada_ (RV 10.61.8); Pa_n.ini refers to da_ks.ina_tya (4.2.98): Maha_bha_rata (Nalopa_khya_na) refers to daks.in.a_patha as south of Avanti (Malwa) and the Vindhyas and to the south of the Vidarbhas and the Southern Kosalas (who lived on the banks of Wardha_ and Maha_nadi_). The age of the later Videhas had the names of Nimi and Kara_la as kings who expanded into the territory extending to the Reva_ or the Narmada_ and the Goda_vari_ rivers. Nimi's Vidarbha region included the modern Berar and also varada_tat.a (region between Wardha_ and Waingan:ga_) and up north upto the river Payos.n.i_, a tributary of Ta_pti_ river. Nimi was of Yadu lineage (Matsya Pura_n.a 44.36; Va_yu Pura_n.a 95.35-36).





Region of the Nahali-speakers

Neolithic and Harappan period settlements in the cradle of the Sarasvati Civilization. The delta area is now called Rann of Kutch. [After KS Valdiya, 2002, Fig. 1.3]

Maheshwar, 90 kms. from Indore, is a town situated on the banks of the Narmada River, in Khargone district of the Indian State of Madhya Pradesh. Archaeological digs at Naodatodi, 2 kilometers away across the Narmada have

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unearthed remains dating from 2000 BCE.In classical periods, Maheshwar was known as Mahishmati or Mahisati, and later Avanti, the state capitol of Raja Bhoja. S'an:kara and Mand.ana Mis'ra (who was a poet in the court of Ma_his.mati) discuss the karma mi_ma_msa philosophy at Ma_his.mati, a place mentioned in both the Ra_ma_yan.a and the Maha_bha_rata. It was the capital city of Ka_rtavi_rarjuna (who killed Jamadagni); it was also the capital city of the Va_ka_t.aka-s (6th cent.) who built the cave-temples of Ellora. This is the ks.etra of Paras'urama, 'Rama of the axe', a Brahmin, born to the sage Jamadagni and his wife Renuka. This is also Bhr.gu ks.etra (cf. Bharuch on the mouth of Narmada river). In the Bhr.gu tradition, Vishnu's consort is Lakshmi, the godess of wealth and fortune. She is believed to have emerged from the samudra manthan, and considered to be the daughter of Bhr.gu and Khyati.

Microlithic sites in South Asia (according to Joseph E. Schwartzberg, ed., 1978, *A historical atlas of South Asia*, Chicago [After Parpola, 1994, fig. 8.9]

Nahali was spoken on the River Tapti, NW of Ellichpur in Madhya Pradesh. Of the vocabulary, 36% are of Kurku (Munda) and 9% of Dravidian origin. Kuiper lists 123 items of vocabulary not reducible to Austro-Asiatic, Dravidian or IE roots, and calculates that “about 24 per cent of the Nahali vocabulary has no correspondence whatever in India”. (FBJ Kuiper, 1962, Nahali, a comparative study. Amsterdam: Noord-Hollandse Uitgevers Maatschappij, pp.49-50; 1966, The sources of Nahali vocabulary, in: H. Zide, Studies in comparative Austroasiatic. Linguistics, ed. N. H. Zide, The Hague, pp. 96-192). Bernard Sergent thinks that Nahali is an Austro-Asiatic language (*Genèse de l’Inde*, p.31.) Gondi *manja* 'man, person'; Tamil *mântar* 'people, men', *man* 'king, husband'; Old Japanese *wo-mina* 'woman' (Modern Japanese *onna*); Ainu *mene-ko* 'woman'; Papuan *munan, mando, mundu* 'man'; Nahali *mancho* 'man'; Egyptian *sn* 'smell'; Hausa *sansana* 'smell'; Georgian *sun* 'smell'; Tamil, Malayalam *cuNTu* 'bill, beak, snout'; Basque *sunda* 'smell'; Tibetan *sna* 'smell'; Nahali *chon* 'nose'; Seneca *oseno* 'smell'; Wintu *sono* 'nose'. Piotr Gasiorowski, a linguist active on the cybalist group: “Strictly speaking, Nahali (spoken on the upper Tapti) is not an isolate, though it's classified as such e.g. on the SIL site. Present-day Nahali is genetically an Indo-Aryan language whose lexicon shows several layers of absorbed substrates. Though the exact percentages apparently vary from dialect to dialect (while minor and endangered, Nahali is not a monolithic languages), according to Kuiper's estimates the largest lexical component (ca. 36%) is borrowed from Kurku (a.k.a. Korku, a Munda language), about 9% of Nahali words are Dravidian (e.g. the numerals 2, 3 and 4, whereas 5 and higher are Indo-Aryan), and some 25% are of unknown origin. Because of the high proportion of Munda loans Nahali has also been erroneously classified as a Munda language or even a dialect of Kurku. The etymologically obscure part of Nahali vocabulary is thought to represent an ancient pre-Indo-Aryan substrate of the Madhya Pradesh/Maharashtra border. Although the figure 25% may be exaggerated, the substrate -- unrelated to any known family -- seems to be real enough. Kuiper's attempts to establish a distant relationship between Nahali and Ainu ("Isolates of the world, unite!") should not be taken too seriously. It's quite possible that Central India was once a crazy quilt of tiny families. Relics of the Nahali substrate and perhaps of other, hitherto unidentified extinct languages may be lurking in the local varieties of Indo-Aryan, e.g. in the numerous but poorly investigated languages of the Bhil group.”
http://groups.yahoo.com/group/cybalist/message/13915

These observations jibe with Emeneau's postulate on a linguistic area and Norman Brown's observations. Recognizing the structure of a proto-Indo-Aryan linguistic area may help explain the glyphs on inscribed objects found between ca. 3500 to 1500 BCE in Sarasvati-Sindhu River basins

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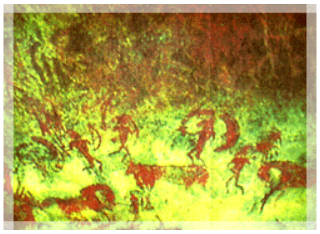
assuming that the linguistic area existed circa 5,500 years Before Present on Sarasvati Civilization area.

Yes, Nahali is spoken on the upper reaches of the Tapati river valley. The Tapati river extensions have been submerged in the Gulf of Khambat when the gulf was formed ca. 10,000 yrs. Before Present and resulted in the start of regular monsoons in India. Nahali provides the key to unravel further the proto-Indo-Aryan using epigraphs of the 4th to 2nd millennia.

Domesticated horse shown on a painting in Cave no. 8 at Bhimbet.ka http://www.art-and-archaeology.com/india/ http://vm.kemsu.ru/en/mezolith/bhimpet.html 	 **Horse depicted in a painting in Cave 4 at Bhimbetka** 

Not far from the region of Nahali speakers is Bhimbet.ka, where 500 caves have pre-historic paintings showing many horses and also chariots (one pictorial motif is interpreted by H.D. Sankalia, as Kr.s.n.a wielding a cakra a_yudha (discus weapon). Horses or chariots are not imports from Central Asia into Bha_rata!

A tool exists to configure the glosses of the ancient dialects of Bharat, circa 3000 BCE. The present-day languages of Bharat are genetically related to these dialects and hence the lexemes of the present-day Bharatiya languages provide the semantic, structural framework for reconstructing the ancient mleccha language which was in vogue on the Sarasvati and Sindhu River Basins and in all the regions of the civilization, circa 5,500 to 3,500 years Before Present.

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Comparative dictionary of Bharatiya languages

An *Indian Lexicon* has been compiled as a comparative study of lexemes of over 25 ancient languages of Bharat (which may also be referred to, in a geographical/historical phrase, as the linguistic area of Bharat).

This compendium of glosses (organized in over 8000 semantic clusters), is a first step in reconstructing the Bharatiya language(s) circa 5000 years Before Present. http://www.hindunet.org/saraswati/dictionary/

These lexemes provide a semantic structure which unify almost all the languages o Bharat into a proto-bharatiya substratum to explain the glosses of many dialects: Munda, Dravidian and Indo-Aryan. These lexemes help code the hieroglyphs contained in epigraphs of Sarasvati Civilization.

Writing originated about 3300 BCE at Harappa on the left bank of River Ravi and about 3100 BCE, at the end of the Uruk period in Mesopotamia, in order to keep track of people and goods. Unlike the writing system of Mesopotamia which evolved in cities, the writing system of SSVC was widespread and reached out into even very small settlements. In the early-to-middle third millennium BCE, the texts record organization of daily activities, especially in temple estates; royal inscriptions reveal the battles fought over the best arable land and securing access to trade routes. In early second millennium, texts relate to private sale of land and movable property and inheritance.

Over 3000 epigraphs exemplifying the writing system of of the Indian (Sarasvati) civilization, ca. 5500 years Before Present, will be decoded using the lexemes, mainly of Bharatiya languages, based on the fundamental assumption that the language spoken by the people of the civilization continued in Bharat and evolved as a dialectical continuum from a linguistic area in the Sarasvati and Sindhu river basins and along the coastline of Sindhu sa_gara or Arabian sea.

Some observations on general semantics and the Indian Linguistic Area

The civilization sites in Punjab, Rajasthan, Cholistan, Kutch and Saura_s.t.ra can be explained by the Sarasvati river as a navigable channel right from Ropar to Lothal (and beyond upto Prabha_s Patan or Somnath), upto ca. 2500 B.C. The existence of this highway and links through the Persian Gulf and the coastline of Sindhu sa_gara (Arabian Sea) may explain the spectrum of languages covered by the linguistic area which had existed around 5,000 years ago.

The evolution of the Pràkrits and dialectical sequences of changes in the region, governed by regional migrations of populations due to the desiccation of the Sarasvati river, ca. 1700-1300 B.C., will require further linguistic analytical work. For this purpose, extensive lexical and other language tasks based on epigraphical, textual and cultural evidences have to continue, following on the leads provided in the *Indian Lexicon.* Thus, the *Indian Lexicon* is only a small step to further understand the formation of Indian languages.

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Further work is necessary to identify lexemes of the substrate language used in cuneiform inscriptions of Mesopotamia, in the context of the re-interpretation of pictorials on cylinder seals with vivid motifs similar to those found in the Sarasvati-Sindhu civilization area.

Any language with a large number of speakers develops dialects. The major geographical barriers (apart from the Himalayas) separating groups of people in India are: the marusthali_ (Great Indian desert), the Suleiman ranges, the Brahmaputra and the Vindhya mountain ranges. The major geographical feature which overcomes these barriers is that the waters close to the long coastline of the peninsula, Arabian sea on the west and Bay of Bengal on the east, were navigable on a **bagala** or a **san:gad.a**. This explains the possibility noted by John Marshall that electrum from Kolar could have been used by the artisans of Mohenjodaro.

Two dialects predominated as the standard form of language in Northern, Western and Eastern India: they emerges as **Prakrit** and **Pali** in the historical periods.

The distinction between 'dialect' and 'language' is resolved viewing dialects as subdivisions of languages. It is a well-known fact that Mandarin, Cantonese and Pekingese differ in their spoken forms but share the same written language, thus making the former dialects of Chinese. Similarly, the so-called Indo-Aryan, Dravidian and Munda are viewed as subdivisions of a proto-Indian **parole**. (The concrete utterances produced by individual speakers of the speech community are related in the exercise of cracking the code of the writing system of the epigraphs of the civilization, treating all the examples provided by Indian lexemes in the *Indian Lexicon*, as merely dialectial variants.)

Hypotheses on Proto-Bharatiya vocabulary

The following hypotheses govern the semantic clustering attempted in this lexicon.

- It is possible to re-construct a proto-Indian idiom or *lingua franca* of circa the centuries traversed by the Sarasvati-Sindhu doab civilization (c. 2500 to 1700 BCE).
- India is a linguistic area nurtured in the cradle of the Sarasvati-Sindhu doab civilization.

The hypotheses reject two earlier linguistic assertions: (i) Sir William Jones's assertion in 1786 of an Indo-European linguistic family and (ii) Francis Whyte Ellis's assertion in 1816 of a southern Indian family of languages.

These two assertions have resulted in two comparative or etymological lexicons of the so-called 'Indo-Aryan' and 'Dravidian' languages. This cleavage between the two language families is rejected. The exclusion of the so-called Austro-Asiatic or Munda (or Kherwa_ri) languages is also rejected. Instead, it is proposed that there was a proto-Indian linguistic area (c. 2500 BCE) which included these three language groups. The underlying assumption is that the so-called Dravidian, Munda and Aryan languages can be traced to an ancient Indian family by establishing the unifying elements, in semantic terms. This echoes Pope's observations made in a different context: '... that between the languages of Southern India and those of the Aryan family there are many deeply seated and radical affinities; that the differences between the Dravidian tongues and the Aryan are not so great as between the Celtic (for instance) and the Sanskrit; and that, by consequence, the doctrine that the place of the Dravidian dialects is rather with the Aryan than with the Turanian family of languages is still capable of defence... the resemblances (appeared) most frequently in the

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more uncultivated Dravidian dialects... the identity (was) most striking in the names of instruments, places, and acts connected with a simple life...' (G.U.Pope, *Indian Antiquary*; loc. cit. R. Swaminatha Aiyar, *Dravidian Theories*, 1922-23, repr., Delhi, Motilal Banarsidass, 1987, pp.11-12).

Grammatical philosophy

Some leads are available to explore further the concept of 'meaning' in philosophical and linguistic terms. "*homo foneticus indicus* was no mere cross-sectioned larynx sited under an empty cranium... on the contrary, the whole man, belly, heart and head, produced voice" (J.E.B. Gray 1959, "An Analysis of Nambudiri R.gvedic Recitation and the Nature of the Vedic Accent", *Bulletin of the School of Oriental and African Studies* 22, pp. 499-530) A word points to an external object, as a semantic indicator; it also refers to the intention of the speaker. One technical term is 'artha' which may be a synonym of 'meaning'. "For the grammarian, 'artha' does not mean the external reality but whatever the word brings to the mind. Artha does not mean vastvartttha but s'abda_rtha, not reality, but, the meaning of words. Individual words bring something to the mind and the sentence as a whole also brings something to the mind. But these things are included in the expression 's'abda_rtha'. Grammar studies both these things in order to evolve notions which will explain the forms of the language. Grammar is satisfied if these notions conform to what we understand from words, no matter whether they conform to reality or not. Grammar does not look at reality directly in the face. As Hela_ra_ja puts it: **s'abdaprama_n.aka_na_m. hi s'abda eva hi yatha_rtham abhidhatte tathaiva tasya_bhidha_nam upapannam; na tu vastumukhapraks.ataya_** : for to those whose authority is the word, the word designates what it corresponds to, and its designation is accordingly appropriate; but it is not for looking reality directly in the face (Hela_ra_ja on Va_kyapadi_ya III. Sam.. verse 66)... Thus while explaining the different conceptions of Time mentioned by Bharttr.hari in the Ka_lasamuddes'a such as that it is an entity which exists apart from the mind or that it is a mere construction of the human mind, Hela_ra_ja says that Bharttr.hari is not really concerned with what time is philosophically, but that he is anxious to examine and analyze that something which is responsible for our putting the Sanskrit verb in different tenses as in **abhu_t** (was), **asti** (is) and **bhavis.yat** (will be). That something may not be able to stand close philosophical scrutiny, but if it serves the purpose of explaining the different tenses, one would have to accept it (Hela_ra_ja on Va_kyapadi_ya. III. Ka_. 58). Similarly in the kriya_samuddes'a, the question is: What is action? The answer given by Bharttr.hari on the basis of the Bha_s.ya passages is that it is a process, something having parts arranged in a temporal sequence. It is not directly perceptible, but it is to be inferred... These parts may be further subdivided and the smaller parts will also be actions. There will come a time when the part cannot be further sub-divided. It cannot then be called action at all. Only that can be called action which has parts arranged in a temporal sequence. After having clearly explained all this, Hela_ra_ja adds that for grammarians the real question is not whether an action has actually parts or not, but whether the verb presents it as such. The answer is that verbs do present action, however momentary, in nature, as something having parts which cannot co-exist but are arranged in a temporal sequence. And Vaiya_karan.as go by what the words present to us. (Hela_ra_ja on Va_kyapadi_ya. III. Kri. 10)." (Subramania Iyer, K.A., "The Point of View of the Vaiya_karan.as", *Journal of Oriental Research*, 18, pp.84-96, 1948).

Iron

ayas metal, iron (RV.); **ayo_, aya** iron (Pali); aya (Pkt.); ya (Si.)(CDIAL 590). yakad.a iron (Si.)(CDIAL 591). yakul.a, yavul.a sledge-hammer (Si.); ayo_ku_t.a, ayaku_t.a (Pkt.)(CDIAL 592). **ayas'cu_rn.a** powder prepared from iron as a vermifuge (Sus'r.);

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yahun.u iron filings (Si.)(CDIAL 489).

In Sarasvati-Sindhu valley archaeological sites, iron objects have been found from 2600 BCE (Possehl, G.L., and Gullapalli, P., 1999, The early iron age in South Asia, in: V. Pigott, ed., *The Archaeometallurgy of the Asian Old World,* Philadelphia, The University Museum Monograph 89, MASCA Research Papers on Science and Archaeology, Volume 16, University of Pennsylvania, pp. 159-161). Iron ore has been attested in eight sites together with some items of everyday use, made of iron. It is unclear if the iron items were smelted: "None has been analyzed to determine their technical properties and we do not know which of them is meteoric and which (if any) were smelted." (Possehl, G.L., and Gullapalli, P., 1999, opcit.) Five iron items (dated ca. 2600 to 2100 BCE), including a copper/bronze bell with an iron clapper, two iron 'buttons' on a copper/bronze rod, an iron button on a copper/bronze mirror, and two lumps of 'carbonates of iron' were found in Mundigak. At Said Qala Tepe, 'ferrous lumps' were found (dated to ca. 2700 to 2300 BCE); at Ahar two iron arrow heads were found (dated to ca. 1275 BCE); at Chanhu-daro an 'iron artifact' is reported; at Mohenjo-daro, lollingite, an iron bearing mineral which may have been used in copper smelting has been found; at Lothal was found a fragmentary piece of metal (dated to ca. 2500 to 1800 BCE); in Swat valley at Katelai Graveyard, a piece of iron was found (dated to ca. 1500-1800). (Possehl, G.L., and Gullapalli, P., 1999, opcit., p. 159).

The discovery of iron smelting in Ganga River Basin dated to early second millennium BCE introduces the imperative of a radical revision of the bronze-iron age sequence. It appears that bronze and iron ages coalesced in Bharat, with bronze used extensively on Sarasvati-Sindhu river valley and iron used in Ganga-Yamuna doab. (Rakesh Tewari, 2004, The origins of iron-working in India: new evidence from the Central Ganga Plain and the Eastern Vindhyas, in: Antiquity, UK, Nov. 2003, http://antiquity.ac.uk/ProjGall/tewari/tewari.pdf

"As discussed elsewhere (Tewari *et al.* 2000) the sites at Malhar, the Baba Wali Pahari, and the Valley are archaeologically linked to the area of Geruwatwa Pahar which appears to have been a major source of iron ore. The Geruwatwa Pahar situated to the southeast of the Baba Wali Pahari, is full of hematite. Villagers reported (as a tradition passed down from several generations), that the *agarias*(a particular tribe known for their iron smelting skills) from Robertsganj side, used to come in this area to procure iron."

[After Figure 6. Damaged circular clay furnace, comprising iron slag and tuyeres and other waste materials stuck with its body, exposed at lohsanwa mound, Period II, Malhar, Dist. Chandauli, p. 542.]

These discoveries point to the semantics of **ayas** in R.gveda as iron, metal. It should therefore, be possible to find homonymous glyphs among Sarasvati hieroglyphs, for example, **aes** 'scales of fish', apart from cognates in Tamil, for example **ayir** 'iron' (Ta.); **ajirda karba** 'iron' (Tulu); **aduru** 'native, unsmelted metal' (Ka.) The iron objcts found in Sarasvati civilization area can now be presumed to have been smelted.

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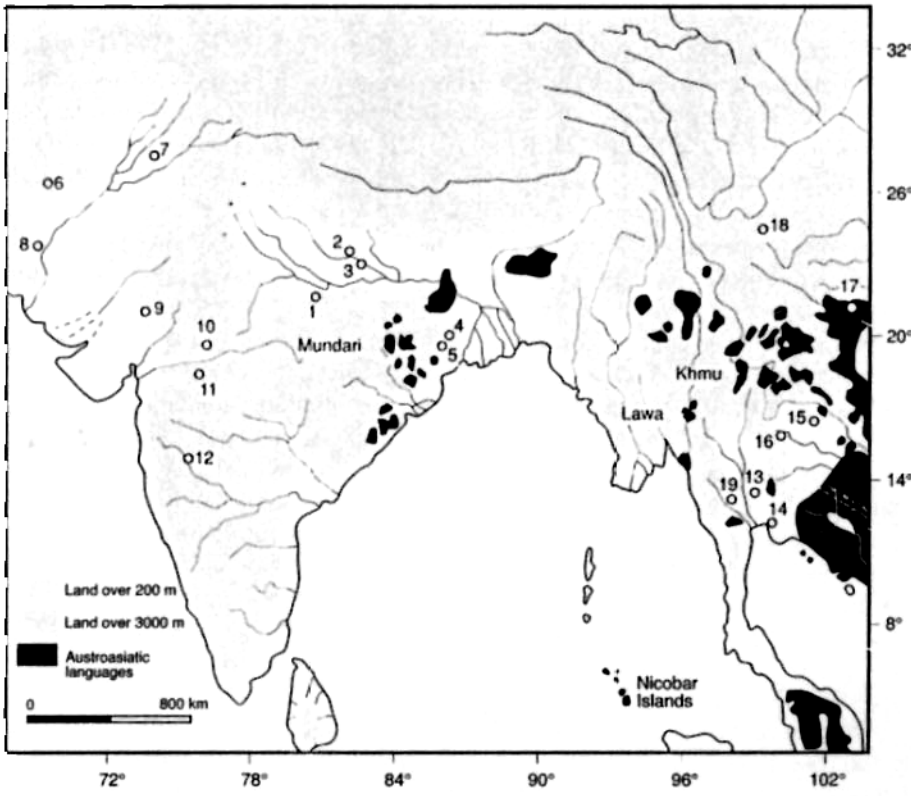

Bronze Age sites of eastern Bha_rata and neighbouring areas: 1. Koldihwa; 2. Khairdih; 3. Chirand; 4. Mahisadal; 5. Pandu Rajar Dhibi; 6. Mehrgarh; 7. Harappa; 8. Mohenjo-daro; 9. Ahar; 10. Kayatha; 11. Navdatoli; 12. Inamgaon; 13. Non Pa Wai; 14. Nong Nor; 15. Ban Na Di and Ban Chiang; 16. Non Nok Tha; 17. Thanh Den; 18. Shizhaishan; 19. Ban Don Ta Phet [After Fig. 8.1 in: Charles Higham, 1996, *The Bronze Age of Southeast Asia*, Cambridge University Press].

"Copper and bronze were widely employed in Pakistan and Central India by 2000 BCE.During the second half of the second millennium BCE, a bronze industry was established in eastern India, in areas now occupied by the speakers of Munda languages…Were it not for the presence of Austroasiatic languages of some considerable time depth, it could easily be concluded that the Indian and Southeast Asian bronze traditions were separate. A shared cognate for copper-bronze beteen Munda, Khmer and Old Mon leaves the nagging feeling that there was some link between metallurgical traditions in the two areas." (Higham, 1996, pp. 294-197).

Ca.2000 BC, there were movements of people in search of minerals and metals. From Meluhha, there were copper mining and smelting expeditions to Oman. At Namazga IV-V (Turkmenia), a number of alloys were experimented with. (Kohl, P., 1984, *Central Asia: palaeolithic beginnings to the Iron age*, Paris, Editions Recherchedes Civilisations, p. 113, 169; Harappan artefacts are found at Altyn-depe in the latest levels; the suggestion is that 'contact was strongest on the eve of the collapse of the site'). At Hissar were found arsenic-bronze, lead-bronze, lead, silver and gold. (Tepe Hissar III, 3rd millennium BCE.: a seal shows a four-spoke wheel). Jarrige reports the find of a vented furnace at Sibri. On the Baluchistan and Afghanistan border, Dales found 'miles of slag and

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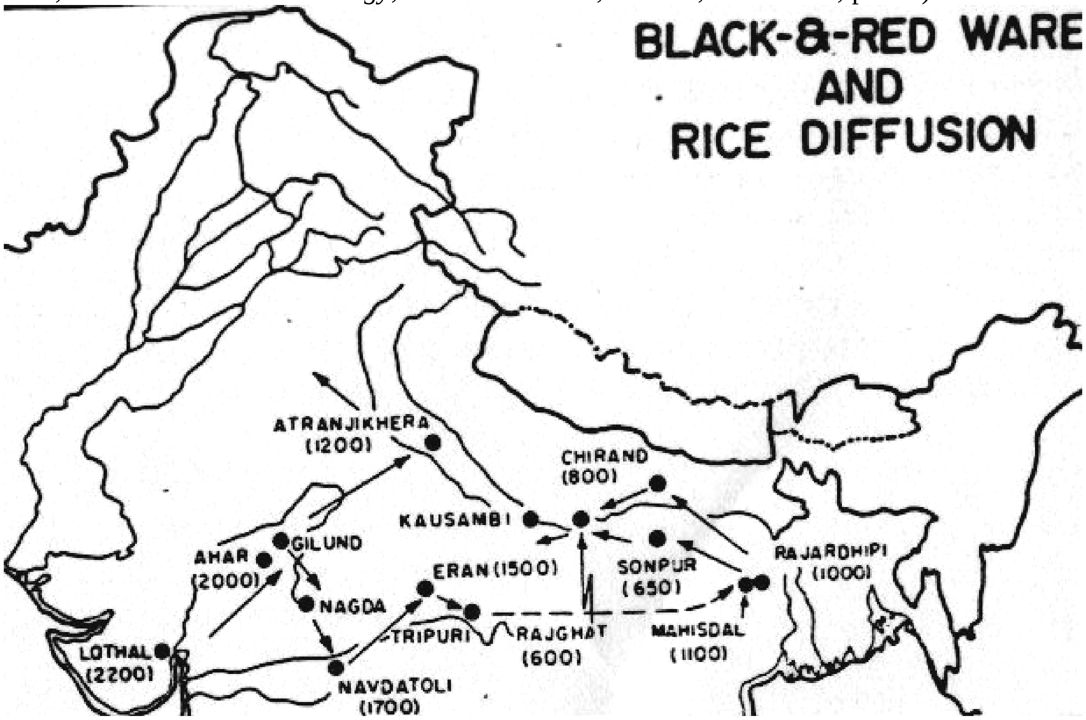
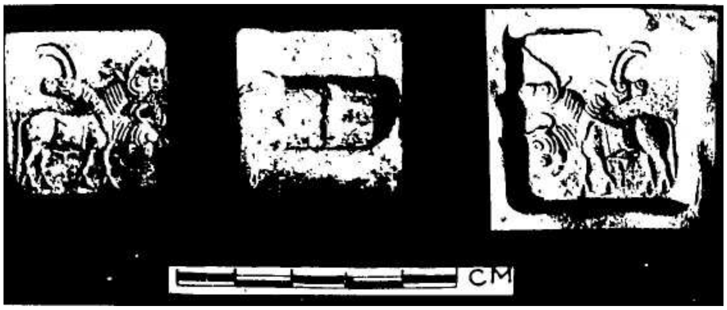
furnaces' (Dales, G.F., 1973, Archaeological and Radioactive chronologies for protohistoric south Asia, in: *South Asian Archaeology*, N. Hammond ed., London, Duckworth, p. 167).



Map showing the probably diffusion of the black-and-red ware techniques and rice cultivation, based on C-14 dates (given in brackets). The earliest appearance of the Black and Red ware is in Lothal (2200 BC) and next comes Ahar (2000 BC). The settlement evidence of this chalcolithic culture and the continuity of the vedic traditions in all parts of India indicate an indigenous development of the civilization from ca. 3000 BCE to 650 BCE (Sonpur).



Amri. Seal. Mature Harappan period. [After J. Casal, Fouilles d'Amri, Paris, 1964]. A one-horned bull ligatured with the heads of an antelope and a short-horned bull. There is no inscription on this seal. Obviously the message is complete with just the ligatured form.

Tradition and a dialectical continuum

Such a metaphor of a Zebu bull or other thousand heiroglyphs can be expressed on any medium: copper plate inscription, glyphs assembled on a sign-board or incised on a weapon itself. The glyptic tradition of writing endures in Bharatiya tradition. The svastika_, the tree, the range of mountains, the dotted circle, the leaf, the tiger looking back, the antelope looking back, hooded serpent, are all heiroglyphic metaphors representing meaning, the material phenomena which provide for life-sustaining activities organized in a community which lives together, in an inter-

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dependent economy. The glyphs on the epigraphs are semantic indicators of a bharatiya language substratum called **mlеccha** or **bha_s.a_,** the parole (**va_k**) a dialectical continuum traceable in all languages of Bharat: vedic **mantra** or Sanskrit lexemes (**s'abda or dha_tu**) or **va_kyapadi_ya** (lit. steps of **va_k**) elaborated by Bhartr.hari.

The dialectical continuum evidenced by languages of Bharat (of all linguistic families) is matched by the cultural continuum in all parts of Bharat with the over-5000-year-old roots found on the banks of River Sarasvati.

The texts of contiguous civilizations provide evidences of speakers of Bharatiya languages moving into new lands west of River Sindhu. The evidences relate to Bogazkoi inscriptions, Mitanni treaties and the glyphs of Mesopotamia and Elam, apart from Avestan texts which can be demonstrated as a direct evolution from Vedic. When availability of soma, electrum, diminishes, substitutes – plants **--** are used both in the Avestan and the Bra_hman.a periods, succeeding the Vedic periods. Juxtaposed to this evidence cluster, there is no evidence whatsoever, either textual or archaeological, supporting movements of people into Bharat during the lithic or chalcolithic or bronze or iron ages.

Sarasvati is not a myth; theories proposing such movements into Bharat are myths created by an inadequate understanding of the indigenous evolution of cultures and cultural continuity of Bharatiya civilization. Sarasvati flowed in all majesty, the **a_suri_ sarasvati** for many millennia before the 4th millennium BCE and saw the dawn of a civilization, nurtured this civilization and left a heritage which is cherished even today all over Bharat. As projects get implemented, River Sarasvati will be re-born to create the impetus for effective water management and to continue to cherish the traditon of **a_pah** as sacred waters. The tradition flowing as **Dharma, R.ta, Vrata and R.n.a** is enduring: every phenomenon is an expression of the cosmic order, an affirmation of the consciousness order which is a quest for unifying the a_tman and the parama_tman, emphasizing responsibility. The very purpose of life is to understand the **r.ta,** the order, the inexorable rhythm. Every function governed by individual potential is a discharge of the debt, the **r.n.a** owed to ancestors, because the present life itself is a product of history and evey individual is a spark from the divine anvil. **Vrata** is a life lived enveloped in spirituality and yoga and with a discipline to relate oneself to social responsibility. This is the central message of the metaphor of Sarasvati as **devi**, divinity who can be seen as an **a_pri_ devata_** and even in ghr.ta (clarified butter) as **ghr.ta_ci_**

This work presents two types of epigraphs: one type is the set of celestial epigraphs observed and recorded by Veda Vya_sa; the other type is the set of terrestrial epigraphs created by artisans, the **vra_tya** and **yajn~ika** of the Sarasvati civilization.. Sarasvati is associated with a writing system: Bra_hmi is another name for Sarasvati. The is the name of an early script used all over Bharat including Tamilnadu and S'ri Lanka. In the philological tradition of Bharat, **bha_s.a_** is the parole, the **mleccha**. Vedic is the mantra. Samskr.tam is the literary, 'correct' form, which is a grammatically, morphologically reconstructed parole, represented by the spoken languages – such as Prakrit and Pali. All these dialectical variations evidence intense borrowings and constructions based on the substratum lexemes used by **Bha_ratam Janam**, the people of the nation of Bharat. The decoding of the epigraphs results in the reconstruction of the **bha_s.a_** in vogue as lingua franca, circa 5500 years Before Present. The reconstruction covers over 2,000 glosses represented by over 600 heiroglyphs used on epigraphs of Sarasvati Civilization.

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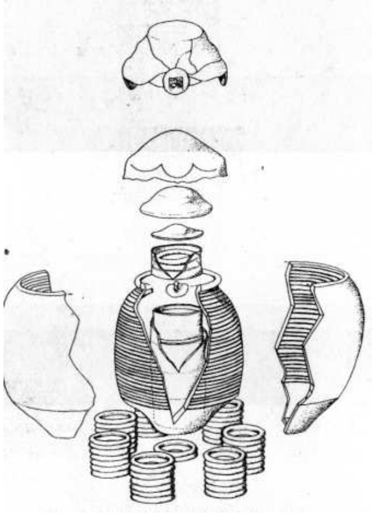
The cumulative evidence, presented by archaeology and texts of contiguous civilization areas, affirms indigenous dawning and autochthonous evolution of the civilization of Bharat with intimations recording contacts with neighbouring civilizations in search of resources and exchange of products.



Large updraft kiln, Harappa (ca. 2400 BCE), found in Mound E, 1984. (After Fig. 8.8, Kenoyer, 1998).

A full-scale reconstruction of the ancient Harappan kiln. Harappa Archaeologcal Research Facility used to fire large storage jar, pottery and figurine replicas. (After Fig. 8.9, Kenoyer, 1998)

Furnace for stoneware bangles. Mohenjodaro, DK-B, C dumps. View of the slag with the coated sub-cylindrical bowl enclosing the stoneware bangles in central position. (After Fig. 1, Massimo Vidale, 1984).

"The man that could make metals was, as one would expect a powerful and important figure. His power sometimes led to his being worshipped; alternatively, he might have been hated. In some tribes, apparently, to call a man 'a smith' was an extreme form of abusive language. Not surprisingly the metal-makers' craft was associated with magic and wizardry. Perhaps that is how the name 'blacksmith' came about. After all, if a man could turn a piece of hard, dull rock into soft, bright metal he was certainly one to be held in respect, or fear. Consequently, the smith's hammer was a sign of power, and an oath taken over his anvil could never be broken. (The importance of a promise make over a blacksmith's anvil was, until recently, well appreciated -- or should have been -- by eloping couples who fled to the Scottish border where they were married by the smith at Gretna Green.) Further, the smith was supposed to be

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able to fore-tell the future by looking at the molten slags in his furnace. Of course, the contemporary metallurgist should be able to foretell the immediate future by looking at his slags; he may even foretell the value of some industrial stocks; but the old smith's abilities went further than that." [J. Gordon Parr, 1958, *Man, metals and modern magic*, Cleveland, American Society for metals].

The R.gvedic and Avestan *kavi* was a smith; kavyava_hana was agni, the carrier of the *havis* (oblation) of *kavi*. He was the singer par excellence, the singer of *sa_man*, the processor of *soma*, electrum.

Some samples of epigraphs presented with lexemes using rebus method

History of Metallurgy tradition in Bharat

The code of the epigraphs which use over 1000 glyphs has been cracked. The glyphs are heiroglyphs representing words rebus (sounding like), unlike the heiroglyphs of Egyptian civilization which are rebus syllables. The epigraphs are property items possessed by the owner of the object on which epigraphs are inscribed. The items are: minerals, metals, furnaces, tools and implements made of minerals and metals. The inscriptions occur on copper tablets and also on weapons themselves, apart from seals, tablets and bangles. Only a metallurgist and lapidary had the competence to inscribe on metal. The legacy continues into the historical periods in Bharat when copper plate inscriptions are used to record property transactions.

Evolution of technology in Bharat finds early expression in the cutting of sea shells (**s'ankha** or *turbinella pyrum*) to create bangles and ornaments. It is also seen in the skills achieved in creating water reservoirs cut out of rocks (as in Dholavira) and architectural accomplishments of creating drains, water tanks with steps and buildings made of shaped stones (including use of polished pillars and ring-stones as structural supports). These developments were made possible by the invention of alloys called bronze, brass, bell-metal and pan~caloha (alloy of 5 metals) which were used for making tools, weapons and also household utensils.

R.gveda is replete with allegorical and direct references to metallurgical activities, exemplified by the metaphor of the ratha to denote cyclical time and related astronomical observations.

Metallurgical tradition of Bharat is highlighted by the iron pillar in Delhi which has stood the ravages of time and shining still after nearly 1,500 years.

The search for minerals and metals was intense during the early Bronze Age in many parts of Europe and Asia. Bharatiyas were also involved in this search and in discovering new alloys. The tradition of cire perdue technique of casting sculptures in bronze and in pan~ca loha (alloy of five metals) continues even today in Swamimalai, in Tamilnadu.

Early metallurgists of Bharat were also writers. They wrote on copper plates. They also wrote on punch-marked coins with exquisite symbols which can now be read as hieroglyphs.

Seafaring merchants from Meluhha traded with Mesopotamia and other neighbouring civilizations in copper, and other minerals. The rivers and the coastline constituted the waterways for trade contacts over an extensive area.

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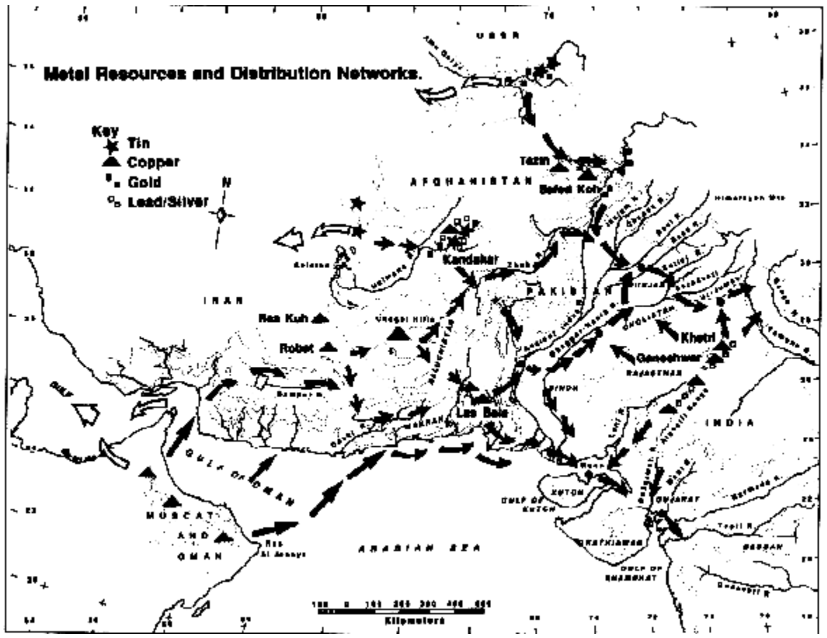
Sources of tin: the great enigma of Early Bronze Age archaeology

Network of mineral resource locations: tin, copper, gold, lead/silver (After J.M. Kenoyer, 1998, Fig. 5.20f). “Copper ore was probably smelted near the mining sources and brought into the Indus Valley as bun-shaped ingots. Major copper sources are located to the west of Baluchistan, the east in Rajasthan and across the gulf in Oman. Any of these areas could have produced enough copper to supply the entire Indus Valley civilization, but the Indus merchants were trading with all these areas. One can imagine traders shouting out the benefits of Oman copper. ‘It is a bit more expensive, but more pure than the slag from Baluchistan or Rajasthan.’ A merchant from Baluchistan would shout back, ‘Omani copper is soft like the meat of a date, while the highland copper is strong and hard like the pit.’ Marine shell was also brought from three sources. The Gulf of Kutch and Saurashtra to the east produced species of shell that were used to make bangles, ladles and inlay. Similar species were obtained from the coast west of Karachi, and a third source was the Omani coast..At the coastal site of Balakot, a local species of clam shell was used.” (J.M.Kenoyer, 1998, p. 94).



Dilmun, Magan, Meluhha are three regions which had traded with Mesopotamia (After PRS Moorey, 1994)

Curved copper knife. Finely woven cloth has been wrapped around one end, possibly to make a handle or as a cap. Harappa. [After Figs. 7.5 Kenoyer, J.M., 1998, *Ancient Cities of the Indus Valley*

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Civilization, OUP.]

Distribution of artifacts in pre-Indus civilization levels[5]

[After Chart 1 in: Dilip K. Chakrabarti and Nayanjot Lahiri, 1996, *Copper and its alloys in ancient India*, Delhi, Munshiram Manoharlal, p.34]

Mehrgarh-I: bead; II: bead, ring; III: crucible, pin, seal; IV: chisel, rod
Kile Gul Mohammad-III: chisel/celt fragment
Damb Sadat-II: dagger/knife
Balakot-I: 4 objects including strip
Gumla-II: handled rod; III: antimony rod, nail-parer
Lewan-Kot Diji phase: rod, sheet, fragment
Tarakai Qila-Kot Diji phase: fragments
Amri-I: knife, bangle
Ghazi Shah: bead, bangle, ring, awl, arrowhead, crescent shaped object
Kot Diji-I: bangle, ring
Jalilpur-I: rod
Hakra Ware and Early Harappan phases in Cholistan: unspecified
Kalibangan-I: rod, ring, wire, pin, arrowhead, celt, bead, axe, bangle, 'lump'
Mitathal: bangle
Banawali-I: unspecified
Harappa-Early Harappan: unspecified
Dholavira: slag, crucible, 'fireplace'
Bagor-Phase 2: arrowhead, spearhead, awl
Ganeshwar-Phase 1: Mesolithic; Phase 2: arrowhead, awl, fish-hook, spear-head; Phase 3: axe, arrowhead, spearhead, chisel, fish-hook, ring, hairpin, bangle, rod, ball, celt
Kunal-Phase1: arrowheads, fish-hooks; Phase 2: arrowheads, beads, spearhead

Artefacts from some other Indus civilization contexts levels

[After Chart 9 in: Dilip K. Chakrabarti and Nayanjot Lahiri, 1996, *Copper and its alloys in ancient India*, Delhi, Munshiram Manoharlal, p61]

Suktagendor: barbed object, bead, needle, knife, celt
Bala Kot: spearhead, arrowhead, bowl
Nausharo: arrowhead, blade, chisel, razor, pin, ball, seal, ring, button, lump, circular object
Gumla: chisel, antimony rod, handled rod
Lohumjodaro: spearhead, razor, awl, knife, ring, bead
Ali Murad: axe, awl
Shaji Kotiro: bangle, chisel, arrowhead
Thano Bula Khan: bangle
Naru Waro Dharo: spearhead
Allahdino: axe, spearhead, bead, pin, hook
Kot Diji: bangle, ring, blade, axe, chisel, arrowhead
Kalibangan: rod, pin, bangle, bead, mirror, arrowhead, hook, ring, chisel, spearhead, celt, awl, knife, dagger, drill, needle, razor, figurine
Banawali: arrowhead, spearhead, chisel, fish-hook, razor, ring, hairpin, rod
Mitathal: ring, wire
Ropar: axe, jar, spearhead, ring, bangle, razor

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Alamgirpur: pin, fragment
Dholavira: seal, knife, chisel, bead, bangle, ornament, pieces
Nagwda: axe, chisel, pendant, ring, strip

Over 200 Harappan artifacts have been subjected to metallurgical analysis; it was noted that 23% were alloyed with tin, 12% with arsenic and 80% with lead. [DP Agrawal, RV Krishnamurthy and Sheela Kusumgar, 1981, Arsenical coppers in the Indian bronze age, in: MS Nagaraja Rao, ed., *Recent Researches in Indian archaeology and Art history*, New Delhi, Agam Kala Prakashan, pp. 9-18]. This is contrasted with the situation of Copper Hoard culture which showed only arsenic alloying and of Chalcolithic cultures which showed only tin alloying. An analysis of two copper artifacts from Nagwada, a mature Harappan site of North Gujarat showed a chisel containing 10.6% tin and an axe containing 2.72% arsenic. [Seshadri, unpublished thesis, loc.cit. in DP Agrawal and Rajam Seshadri, 1998, The Metallurgical tradition of the Harappans, in: Vibha Tripathi, ed., *Archaeometallurgy in India*, Delhi, Sharada Publishing House, pp. 10-15]. Some of the c-14 dates for ancient copper workings are: 1. Dariba mines, Udaipur Dist., Rajasthan 3120+-160, 2310+-105 BP; 2. Ambamata, Banaskantha dist., Gujarat 2110+-200 BP; 3. Ingaldhal, Chitradurga Dist., Karnataka 1730+-110; 4. Ranihat, Tehri Garhwal 1690+-140 [DP Agrawal, C. Margabandhu and NC Shekhar, 1976, Ancient copper workings. Some new 14C dates, *Indian Journal History of Science*, 11, No.2, pp. 133-136].

In Swamimalai, 8 km. From Kumabakonam in Tamil Nadu, the **vis'vakarma** tradition of *cire perdue* technique of sculpting in bronze and pan~caloha (five metals) continues even today. Located on the banks of River Kaveri, this place has a natural resource: clay from the river banks, which is so fine that it did not crack when fired and would leave sharp imprints when pressed. The local tradition traces the technique of **madhucchis.t.ha vidha_na** to vedic times and equates the pan~cajana_h (five peoples) with: manu, 'iron monger'; maya 'wood worker'; tvas.t.a 'vessel maker', vis'vajn~a 'goldsmith'; and s'ilpi 'sculptor'. A person versed in the skill of any three of these professionals calls himself a **sthapati.** The processes involved in the technique of *cire perdue* in vogue are simple. A figure is hand-moulded using hard wax. The finished wax figure is encased in clay and sun-dried. The dried clay case is heated to melt and drain the wax. Molten alloy is poured into the hollow space. The rough cast which emerges is hand-finished to remove the rough metallic protrusions and polished. The technique can produce bronze sculptors which weigh as much as 2 tonnes and as high as 15 feet.cire perdue

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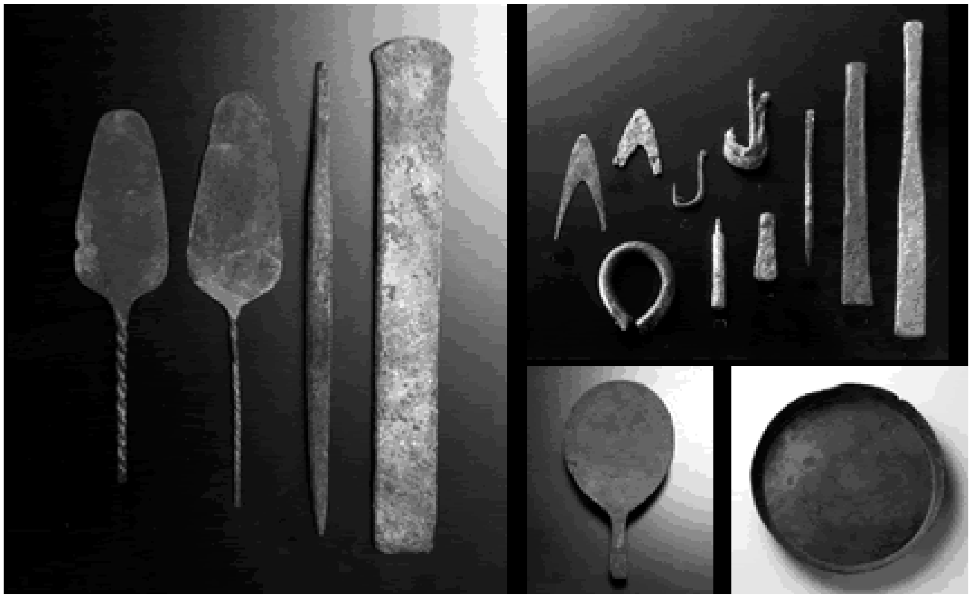
The most exquisite example of the use of bronze is the bronze statuette of a

woman made using the **cire perdue** technique, a technique which is still in use in Swa_mimalai, Tamilnadu to make bronze images of utsava be_ra-s (mu_rti-s).

The bronze statue of a woman wearing bangles and holding a small bowl in her right hand, Mohenjo-daro (DK 12728; Mackay 1938: 274, pl. LXXIII, 9-11). The statue was made using *cire perdue* (lost wax) method, a method used by vis'vakarma-s in Swa_mimalai to make bronze figurines of deities – vis'vakarma tradition lives on.



"Copper and bronze implements included farming implements and tools, fishhooks, weapons, ornaments and vessels. These metal implements may have served as status symbols. They were manufactured in two ways: 1) by casting (pouring molten metal into moulds); and 2) by heating and hammering the metal into shape." http://bosei.cc.u-tokai.ac.jp/~indus/english/2_2_05.html Many bronze implements are seen to have been made using *cire perdue* method.

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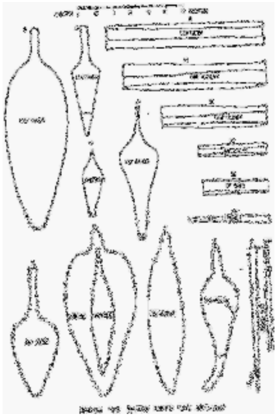
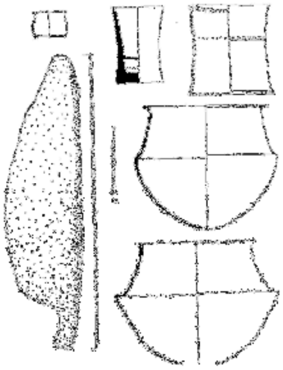
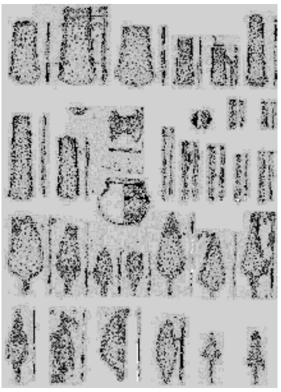
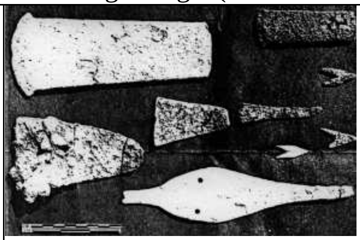
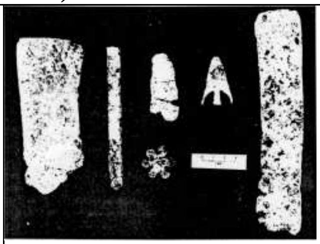
"**The Harappans had a well developed and highly specialized metal technology, but oddly enough it is one of the least studied craft traditions**." [KK Bhan, Vidale Massimo and Jonathan Mark Kenoyer, 1994, Harappan technology: theoretical and methodological issues. *Man and Environment* 19: 141-57].

Most artifacts are utilitarian with an array of pots and pans in metal. ; images of dancer, foot with anklet, cast figures of animals show the use of lost wax (cire perdue) method of casting of copper/bronze. The major weapons are: sickle blades with externally sharpened edge; chisels; spearheads, thin barbed arrow-heads; straight and circular saws; blade-axes; mid-ribbed daggers; drill, and eyed needles. "It may be pointed out that needles with eyes on the pointed ends, true saws, circular saws, and drills are Harappan contribution to the world of instruments."

Chisel."The flattened shanks are expressly meant to be fixed in handles. The pointed chisels with round sections were means for cutting stone…They were probably employed for simple woodwork, and it may be for soft stones, such as steatie, which was very commonly used at Mohenjo-daro. The smaller tools were perhaps employed for engraving." (Marshall 1931: 502).

Blade-axes, arrow-heads, splayed blade, spear-head, chisel: Dholavira. [After Fig. 5.28 in DP Agrawal, 2000]. Arrow-heads from Harappa 1995 excavation. [After Fig. 5.29 in DP Agrawal, 2000].	 **Awl and Reamer.** Pl. CXXXV,7: copper, 7.7 in.	 Pl. CXXXV, 11: copper, 9 in. long. Pl. CXXV, 12: copper, 8.2 in. long. **Sword dirk.** Pl. CXIII,3: copper, blade and tang 15.75 in. long; two rivet holes at the junction of the tang and the blade.

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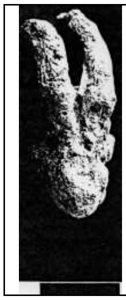
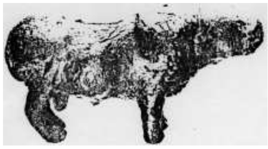
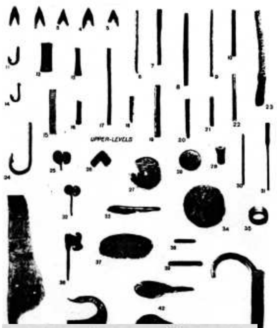
				

Copper arrow-heads and other implements: Balathal, Rajasthan [After Fig. 7.12 in: DP Agrawal, 2000].
Bronze ram on stand, DK area, Mohenjo-daro. No. DK 10781.
Bronze. Horned goat from Harappa 1995 excavation. [After Fig. 5.26 in DP Agrawal, 2000].Bronze antelope: Mohenjo-daro [After fig. 5.11 in DP Agrawal, 2000]
Two views of a bronze buffalo: Mohenjo-daro. No. Sd. 3319.
Rings, knife and blade from Harappa 1995 excavations. [After Fig. 5.27 in DP Agrawal, 2000].



Copper/bronze weapons including arrow heads, DK Area, Mohenjo daro [After Fig. 5.23 in DP Agrawal, 2000]. **Arrow head.** Pl. CXLII,12: 1.3 in. long, .5 in. thick. **Knife/dagger.** Pl. CXXXV,3: copper knife, 6.7 in. long, 1.23 in. wide. Pl. CXXXV,6: copper, a leather cutter? 6.2 in. long

Razor. Razors were classified into double-blade, L-shaped, hook-shaped and simple-bladed sub-types. The double-blade type was most common. 'The blades are always very thin and paper-like, and the tangs which are oval in section are not very much thicker. It will be noticed that the two blades of a razor are not the same shapes; probably each side had its own purpose. They were roughly cut out of sheet metal and the blades subsequently spread by means of a hammer before being finally trimmed into shape. None of these razors is very large, the biggest that we have found being only 2 inches across the blade. It seems unlikely that they were set in handles, for in the better preserved specimens the metal tang, thin as it is, would suffice for holding blades as light as these.' (Mackay 1937-38: 468) (DP Agrawal, 2000, p.79).

Lothal. Bun-shaped ingot (Copper). [After Pl. LXIII in SR Rao].

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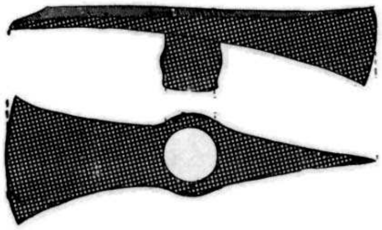
Mohenjo-daro. Two views of a socketed axe-adze.

0.5 in. long. A projecting socket .7 in. dia. Horizontal blade is 2.52 in. wide and the axe-blade 3.5 in. wide. [John Marshall, 93 , *MIC*, Vol. III, Pl. CXXXVIII, 6].



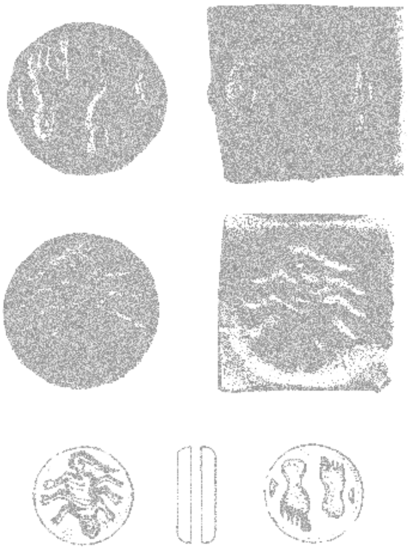
Rebus: **kuduru =** a goldsmith's portable furnace; **kudul.l.u** (pl.) (Te.lex.) *kudru* top of fireplace (Kuwi)(DEDR 1709).

h172B The over-arching glyph is that of a lizard. **kudur d.okka** a kind of lizard (Pa.); kudur d.okke id. (Go.); kudur d.ekke garden lizard (Go.); kidri d.okke house lizard (Go.)(DEDR 1712). [Note the glyphs of what is often called the gharial or alligator; could it be the common house lizard?] The glyph is sometimes shown catching the scale of a fish. a~s = scale of fish (Santali); rebus: ayas 'metal' (Skt.) bed.a = either opening of a hearth (G.); bed.a hako = a type of fish (Santali) cf. assem 'electrum' (Old Egyptian) cf. kamsala = of the goldsmith's caste; kamsamu = bell-metal; kamsalava_d.u = a goldsmith, a silversmith, a jeweler working in gold, silver and gems; kamsa_lava_d.u, kamsa_li = kamsa (Te.) ams'u = filament of soma (S'Br.); amsu thread (Pali); amsu sunbeam (Pkt.)(CDIAL 4) hasli_ = gold or silver collar (P.); hasu = silver collar (S.)(CDIAL 6).

Inventory of Hearth and Furnace

The pairing of fish and lizard is to connote possessions or an inventory of a hearth and a furnace.

Tepe Yahya. Six-legged lizard and opposing footprints shown on opposing sides of a double-sided steatite stamp seal perforated along the lateral axis. Lamberg-Karlovsky 1971: fig. 2C



Six legs of a lizard is an enumeration of six 'furnaces'; rebus: **kakra.** 'lizard'; **kan:gra** 'portable furnace'. That an enumeration is intended is seen from the glyph of a pair of soles depicted on the obverse side of the seal from Tepe Yahya:
d.okke lizard (Kol.)(DEDR 2977). Thus when a lizard is shown holding a fish in its jaw, the message is: possession, *hako* (glyph: fish, substantive: axe*); ke~r.e* bell-metal, brass; *ken.t.a* fish

m0410 Pict-64: Gharial (or lizard) snatching, with its snout, the fin of a fish 2133 Glyph: *kakr.a* 'common lizard'; *kakr.a hako* a species of fish (Santali)

ker.e sen:gel fire in a pit, as the Koles burn charcoal (Santali)

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ken.t.ai, freshwater fish, barbus (Ta.); **ken.t.a** a carp, cyprinus; gen.d.e-mi_n a sort of fish (Ka.); gan.d.e, gen.d.e a fish; gen.d.i, gen.d.iya, gen.d.e the carp, cyprinus fimbriatus (Te.; kin.d.o_ a species of fish; kindo_ injo~ carp fish (Kur.)(DEDR 1947). kan.d.a_yi = gar fish (fish) (Ta.)

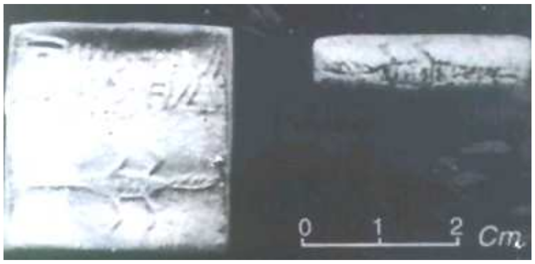
a~s = scales of fish (Santali); rebus: aya = iron (G.); **ayah**, **ayas** = metal (Skt.); hence, lizard + fish = **kan:gar + a~s** = furnace + metal

Substantive: *kan:gar* furnace; *ken.t.a (ke~r.e~)* bell-metal, brass; hence, lizard snatching fish may be read as a compound term: bell-metal, brass furnace.

Glyph: **gan.d.a** 'male person, hero' (Ka.)

talka sole of foot; **tala, tola** sole of shoe (Santali) **talka** = palm of the hand, ti talka (Santali.lex.) ti = the hand, arm (Santali.lex.) [A count of 12 phalanges on a palm, constitutes a palm of the hand]. Thus, the rectangle depicts, two talka-s or two palm-counts, i.e. two (san:gad.a) twelves or 24. bar, barea = two (Santali.lex.) ba~r.ia~ = merchant (Santali.lex.)

talika = inventory, a list of articles, number, to count, to number; hor.ko talkhaetkoa = they are counting the people; mi~hu~ merom reak talikako hataoeda = they are taking the number of the cattle (Santali.lex.) The boxed count of 24 (on one side of tablet shown in Slide 205 represents an inventory of san:gha_ta or component articles, represented by the inscription of 4 glyphs: carpenter's axe (badhor. hako), anvil (d.ha~go), furnace (kan.d.a kanka), razor (bakhor.) (an instrument, with which tassar cocoons are cut into narrow strips for splicing purposes; teeth of a comb represented by **E**).



Rakhigarhi: Cylinder Seal (Courtesy ASI)

Substantive: *kakar*. 'another name for Pilcu har.am, the first man according to Santal tradition (Santali)

Sumerian cylinder seal impression from Tell Asmar; the animals are: rhinoceros, elephant and alligator (or, lizard); glazed steatite, height 3.4 cm.; cylinder seal rolled over wet clay. (After Frankfort, 'The Indian Civilization and the near East', *Annual Bibliography of Indian Archaeology*, 1932, p.3, Pl. I and Heras, 1953, p. 219; Tell Asmar (Eshnunna), Iraq. IM 14674; glazed steatite; Frankfort, 1955, No. 642; Collon, 1987, Fig. 610.)

hako it.an:kar = fish, alligator; i.e. axe, blacksmith. The alligator, **it.an:kar** could be a pictorial motif equivalent of a bull, **d.an:gar**.

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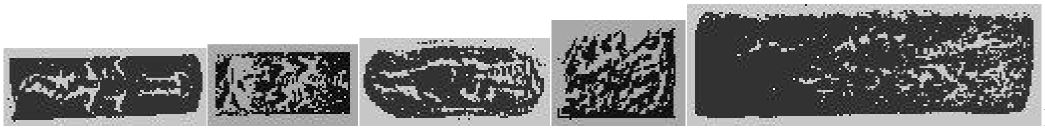
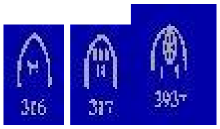
 Pictorial motifs 63 to 67 (Gharial sometimes with a fish held in its jaw or surrounded by a school of fish)

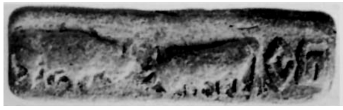
kumpat.i = chafing dish (Te.)

 **gummat.a** cupola, dome (Ka.)

Dholavira. Stone sculpture of monitor lizard

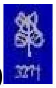
Glyph: **samanom** = gold (Santali) **sama_n.o** = a goldsmith's pincers (G.); cimat.ige, cimat.a = a pair of tweezers, pincers, nippers (Ka.M.); cimat.a_, cimit.a_, cimmat.i (Te.); cavan.e, cavin.e (Ma.); **ca_man.a**, ca_van.a, s'ravan.a (Ta.)(Ka.lex.) cimt.a_ to pinch (B.); cimat.n.e~ id. (M.)(CDIAL 4822). cimut.u = to squeeze, pinch (Ka.)(DEDR 2540).

Glyph: **homa** = bison (Pe.); hama id. (Mand.); **soma** = a wild buffalo (= bison)(Kui); homma bison (Kuwi); **ho_ma** sambar (Kuwi)(DEDR 2849).
m440AC Two short-horned bulls facing each other on the top register.

 m0492Atm0492Bt Pict-14: Two bisons standing face to face.

Glyph: **saman** = front, to front or face; **samna samni** = in front, face to face, confronting; **samne** = facing, face to face; in the presence of (Santali) cf. sama_na = equal, like (G.) sama_na = same, alike ($RV); an equal (VS); like, equal (Pali); sama_n.a (Pkt.); sama_n = like, equal, average (K.); sama_n.u~ = like, equal (G.)(CDIAL 13211). sama = equal, alike, level (RV); sama id. (Pali.Pkt.); somo = friend of the same age (Sh.); somu, sombu = level (K.); **so~a_** (B.)(CDIAL 13173).

kamad.ha, kamat.ha, kamad.haka, kamad.haga, kamad.haya = a type of penance (Pkt.lex.)

Sign 326 (35) occurs on copper tablets. **Sign 327 (42)** **kamar.kom** = fig leaf (Santali.lex.) **kamarmar.a_** (Has.), **kamar.kom** (Nag.); the petiole or stalk of a leaf (Mundari.lex.)

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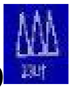
Rebus: **kamat.ha_yo** = a learned carpenter or mason, working on scientific principles (G.) **kammat.i_d.u** = a goldsmith, a silversmith (Te.) **kamat.amu, kammat.amu** = a portable furnace for melting precious metals (Te.)

The leaf glyph can also be ligatured with summit of mountains glyph. (smith's workshop: **kamat.a ku_t.am**: fig leaf + summit)

Sign 230 (54) **ku_t.amu** = summit of a mountain (Te.lex.) Rebus: **ku_t.akamu** = mixture (Te.lex.) **ku_t.am** = workshop (Ta.)

An alloyed metal, **ku_t.a** [e.g. as in: **a_raku_t.a** = brass (Skt.)]

Cylinder seal and modern impression: hunting scene, 2250–2150 B.C.; late Akkadian period Mesopotamia Chert; H. 1 1/16 in. (2.8 cm) This seal, depicting a man hunting an ibex in a mountain forest, is an early attempt to represent a landscape in Mesopotamian art. It was made during the Akkadian period (ca. 2350–2150 B.C.), during which the iconographic repertory of the seal engraver expanded to include a variety of new mythological and narrative subjects. The owner of the seal was Balu-ili, a high court official whose title was Cupbearer.

http://www.metmuseum.org/toah/ho/02/wam/hod_41.160.192.htm

Mountain topped by a leaf gets stylized as an important motif. Pro-elamite glyptics. Leaf motif. 1-c, After Legrain,L., 1921, Empreintes de cachets elamites, *Mem. Mission Arch. De Perse* 16, Paris: 62-654; d. After Amiet, P., 1961, *La glyptique mesopotamienne archaique*, Paris: 497; Mundigak IV.3; 3. After Casal, J.M., 1961, Fouilles de Mundigak I-II. *Mem. Delegation Arch. Franaise en Afthanistan* 17, Paris: fig. 102: 485; f. Early Harappan. Kalibangan. After Sankalia, 1974: 346, fig. 88d, A. H-L; cf. Fig. 23.45 Asko Parpola, 1996, fig. 23.45. Two goats eating from a tree on a mountain top in proto-Elamite seals from Susa [After Amiet, P., 1972, Glyptique susienne I-II, *Mem. Delegation Arch. En Iran* 43, Paris: 978 and Legrain, L., 1921, Emprientes de cachets elamites, *Mem. Mission Arch. De Perse* 16, Paris: 316]. **mr..eka** 'goat' (Te.); **melakku** 'copper' (Pali) Copper mint workshop with furnace ! The stars framed by the horns are determinatives, **kol.**i 'planet'; **kol** 'metal' (Ta.) Two five-petalled *taberna montana* (**tagaraka**) are also shown on the second hill; rebus: **tagara** 'tin'.

An antelope – **mlekh** 'goat' (Br.); rebus: **mleccha** 'copper' (Skt.); **melakku** 'copper' (Pali)-- is shown with a seven-pointed star around a dotted-circle on tablet h349A, h349B

suk'erika 'stars' (Kuwi)(DEDR 2646) *sukar*, *sukor* 'the planet vennus as evening star' (Santali) Rebus: *sokol* 'fire'

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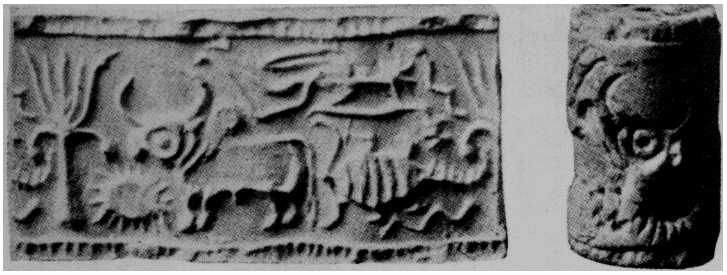
(Santali) *bar* ‘two’; Rebus: *bara* ‘oven’
Seated person: *hasani* ‘fireplace’; *asani* ‘seated’



urseal6 Cylinder seal; BM 122947; U. 16220 (cut down into Ur III mausolea from Larsa level; U. 16220), enstatite; Legrain, 1951, No. 632; Collon, 1987, Fig. 611.Humped bull stands before a plant, feeding from a round manger or a bundle of fodder (or, probably, a cactus); behind the bull is a scorpion and two snakes; above the whole a human figure, placed horizontally, with fantastically long arms and legs, and rays about his head.

takaram tin, white lead, metal sheet, coated with tin (Ta.); tin, tinned iron plate (Ma.); tagarm tin (Ko.); tagara, tamara, tavara id. (Ka.) tamaru, tamara, tavara id. (Ta.): tagaramu, tamaramu, tavaramu id. (Te**.); t.agromi** tin metal, alloy (Kuwi); tamara id. (Skt.)(DEDR 3001). trapu tin (AV.); tipu (Pali); tau, taua lead (Pkt.); tu~_ tin (P.); t.au zinc, pewter (Or.); **taru_aum** lead (OG.); tarvu~ (G.); tumba lead (Si.)(CDIAL 5992).

takar sheep, ram, goat (Ta.); *tagar* ram (Ka.); *tagaru* (Tu.); *tagaramu*, *tagaru* (Te.); *tagar* (M.)(DEDR 3000).

t.agara = *taberna montana* (Skt.)

ran:ga, ran: pewter is an alloy of tin lead and antimony (an~jana) (Santali).

ran:ga ron:ga, ran:ga con:ga = thorny, spikey, armed with thorns; edel dare ran:ga con:ga dareka = this cotton tree grows with spikes on it (Santali) [Note the thorns on the round object in front of the bull on the Ur cylinder seal impression – U 16220]

Each of the glyphs shown on this cylinder seal may relate to lexemes connoting mineral ores: a flowering shrub; scorpion; bull; a wide-mouthed pot, monkey(?), two serpents on the upper register. Humped bull stands before a palm-tree, feeding from a round manger or a bundle of fodder (probably, rays of sun or a cactus); behind the bull is a scorpion and two snakes; above the whole a human figure, placed horizontally, with fantastically long arms and legs, and rays about his head.

The glyphs on this cylinder seal are:

*Short linear strokes borders on top and bottom of the cylinder

*A zebu (Bra_hman.i) bull

**A cactus (with thorn) or radiating sun in front of the bull

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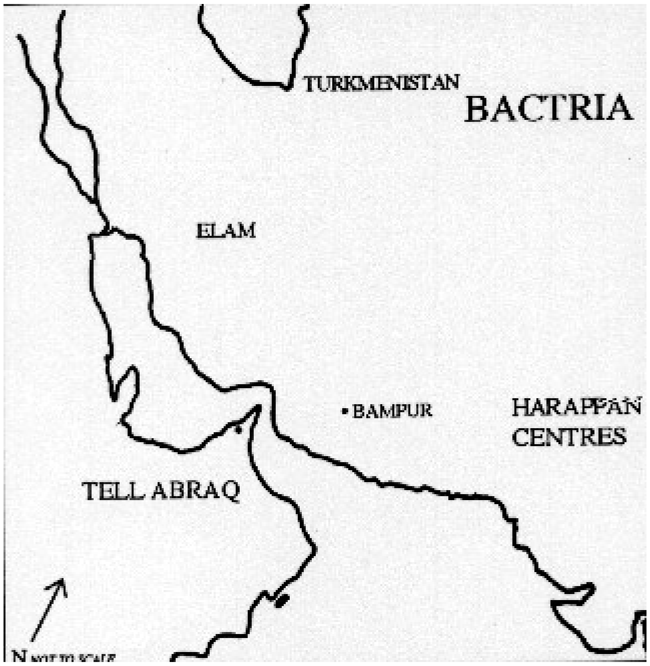

If the round object with thorns in front of the bull is a stone, then it may connote **vat.loi**, stone, a rebus of brass, vat.loha is apposite, the enstatite seal may contain other metal/mineral rebus representations.
[Or, sun depicted with rays? glyph: **arka** ‘sun’; rebus substantive: **akka, arka** ‘copper’]

***A scorpion**

*A wavy line (snake? glyph: **na_ga** ‘snake’; rebus substantive: **na_ga** ‘lead’) below the scorpion (horizontal)

*A five-petalled plant (or, flower?) *Tabernae montana*? [A similar pictorial motif is noticed in some inscribed objects of Bactria-Margiana Archaeological Complex (Lamberg-Karlovsky)]

*A person with a turned face and hair tied into a bun (?) and bangles on one visible arm [depicted on the upper register (horizontally, perhaps to save space on the cylinder)] The person is tall and thin: *kan:kar., kan:kur.* very tall and thin, large hands and feet (Santali)

***Taberna montana* motif on an inscribed copper-alloy axe**

In the pictures of a shaft-hole axe with relief decoration, there are motifs which recur in the SSVC inscribed objects: *taberna montana* (with three prongs, possibly five), smiting person with his hair tied into a bun at the back bound by a rolled fillet and with a short beard or stubble on his face, kneeling adorant, tree:

Shaft-hole axe with relief decoration (both sides). Copper alloy. Southeastern Iran. C. late 3rd or early 2nd millennium BCE 6.5 in. long, 1980.307 Metropolitan Museum of Art, New York.

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"However, the combined problems of unknown provenance and unparalleled features make this attribution tentative. The symmetrical axe has a splaying blade, an elliptical shaft hole with semicircular outline pierced by rivet holes, and a fan-shaped butt. Both sides are ornamented with low-relief figural decoration, cast as one with the axe. The features of the figures were detailed by chasing that has been partially obscured by corrosion. On one side is a male figure in a smiting posture, with his left hand raised above his head holding a club and his right leg extended and carrying the weight of his body. On the butt is a three-petalled floral form with two leaves emerging from a circular stem. On the other side are two registers: above is a standing figure turning his head back and perhaps raising his left hand in a plea for mercy; below, in front of a tree, is a bound, kneeling prisoner, behind whom is the upper body of a victim falling headfirst to the ground. **The images on the axe, when both sides are considered, suggest the commemoration of military victory. The smiting figure is the victorious ruler, and the standing figure and bound, falling captives are his vanquished enemies. In Mesopotamia, military victories were often celebrated on monumental carved and inscribed steles set up on public view. One of the most famous of these monuments, even in antiquity, and one that shares numerous features with the axe, is the stele of Naraim Sin, thought to have been originally displayed in the city of Sippar to memorialize his victory over rebellious tribes in the Zagros mountains…It is likely hat the same imagery also inspired the victory scene illustrated on the copper axe…it is possible to suggest that it was made in the east under the influence of Akkadian imagery.**"[After Fig. 7 in: Holly Pittman, 1984, *Art of the Bronze Age: Southeastern Iran, Western Central Asia, and the Indus Valley*, New York, The Metropolitan Museum of Art, pp. 29-30].

Logographs: (1) Dotted circles and (2) *taberna montana* motif

Tell Abraq comb (TA 1649; 11x8.2x0.4 cm); decorated bone comb in a context datable to ca. 2100-2000 BCE at Tell Abraq, emirate of Umm al-Qaiwain, United Arab Emirates, on the southern coast of the Arabian Gulf (Fig. 2 a and b in: D.T. Potts, 1993, A new Bactrian find from southeastern Arabia, *Antiquity* 67 (1993): 591-6) Two logographs used are: dotted circles (3) and two flowers, long-stemmed, with lanceolate-linear leaves with undulate margins (like Tulipa montana, Lindl. or mountain tulip). The flower motif occurs on a Bactrian flask (picture below).

A soft-stone flask, 6 cm. tall, from Bactria (northern Afghanistan) showing a winged female deity (?) flanked by two flowers similar to those shown on the comb from Tell Abraq (After Pottier, M.H., 1984, *Materiel funeraire e la Bactriane meridionale de l'Age du Bronze*, Paris, Editions Recherche sur les Civilisations: plate 20.150)

Location of Tell Abraq, southern coast of Arabian Gulf

It will be established through the use of lexemes from the Indian linguistic area that the motifs: (1) dotted circles which recur on ivory combs; and (2) the flower -- 'three-leaf motif' (which looks like a mountain tulip)-- both motifs are related to the cosmetic substances used by women to beautify their hair and bodies (unguents for hair and body). The 'dotted circles' motif also occurs in metallurgical contexts. The 'three-leaf motif' also occurs in metallurgical contexts (See the inscription of the single sign resembling this motif on the Cretan copper ingot--illustrated). The homonyms which relate to cosmetics also represent lexemes related to metallurgy.

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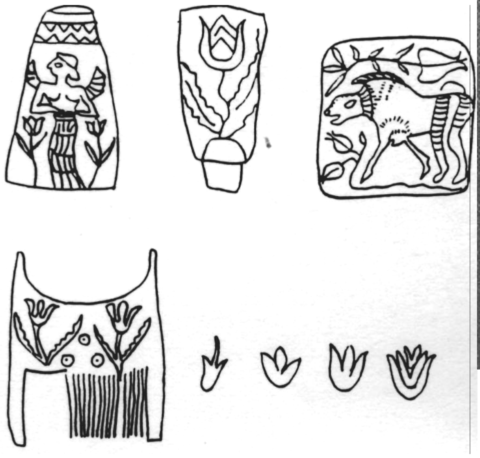
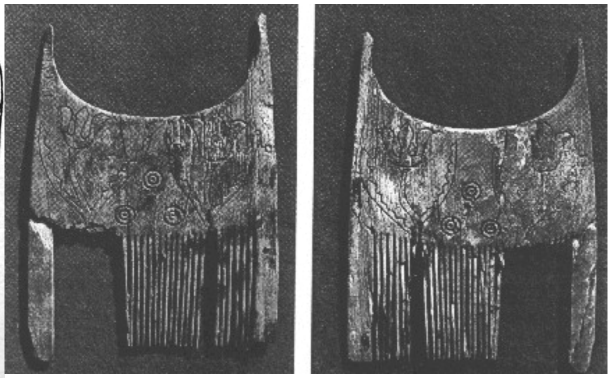
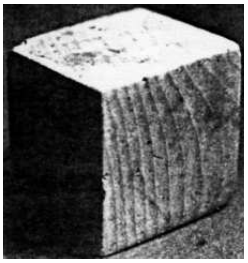




Ivory comb with Mountain Tulip motif and dotted circles. TA 1649 Tell Abraq.

[D.T. Potts, South and Central Asian elements at Tell Abraq (Emirate of Umm al-Qaiwain, United Arab Emirates), c. 2200 BC—AD 400, in Asko Parpola and Petteri Koskikallio, *South Asian Archaeology 1993*: , pp. 615-666]

Tell Abraq is an Arabian peninsula site which used Harappan weights circa 2200 BCE..



Harappan weight TA 1356 from Tell Abraq. C. 22nd cent. BCE. Banded chert or flint weight 54.06 g. This is approx. 4 times the unit Harappan weight of 13.63 g.

Wild tulip motif. A motif that occurs on southeast Iranian cylinder seals and on Persian Gulf seals. 1st row: Bactrian artifacts; 2nd row: a comb from the Gulf area and late trans-Elamite seals [After Marie-Helene Pottier, 1984, *Materiel funeraire de la Bactriane meridionale de l'age du bronze*, Recherche sur les Civilizations, Memoire 36, Paris, fig. 21; Sarianidi, V.I., 1986, Le complexe culturel de Togolok 21 en Margiane, *Arts Asiatiques 41*: fig. 6,21; Potts, 1994, fig. 53,8; Amiet, 1986, fig. 132]. The ivory comb found at Tell Abraq measures 11 X 8.2 X .4 cm. Both sides of the comb bear identical, incised decoration in the form of two long-stemmed flowers with crenate or dentate leaves, flanking three dotted circles arranged in a triangular pattern. Bone and ivory combs with dotted-circle decoration are well-known in the Harappan area (e.g. at Chanhu-daro and Mohenjo-daro), but none of the Harappan combs bear the distinctive floral motif of the Tell Abraq comb. These flowers are identified as tulips, perhaps Mountain tulip or Boeotian tulip (both of which grow in Afghanistan) which have an undulate leaf. There is a possibility that the comb is an import from Bactria, perhaps transmitted through Meluhha or SSVC to the Oman Peninsula site of Tell Abraq.

[The homonym, **takarai**, or **tagaraka** is a five-petalled *tabernaemontana* flower used as a hair-fragrance]. tagar = a flowering shrub; a plant in bloom (G.lex.) tagara = the shrub tabernaemontana coronaria, and a fragrant powder or perfume obtained from it, incense (Vin 1.203); *tagara-mallika_* two kinds of *gandha_* (P.lex.) *t.agara (tagara)* a spec. plant; fragrant wood (Pkt.lex.) *tagara* = a kind of flowering tree (Te.lex.)

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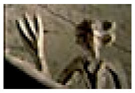
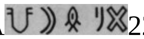


Seal impression from Harappa (Kenoyer, 1998); a woman is carrying a three-petalled flower (interpreted as **tagaraka**, used as an aromatic unguent for the hair; see the emphasis on the hair-do, with two buns of hair). takaram means 'tin' (Tamil).

Rebus substantive: **samanom** = an obsolete name for gold (Santali) **hom** = pom, hem = gold; hombat.t.al = a golden cup; hombara.ni = a gold jar or vase; hombar-e = go gild; hombesavu = gold soldering (Ka.) hem = a medicinal garden plant with yellow heads of flowers, *spilanthes semella* (Ka.) **hon, honnu** = gold (Ka.) honnu = gold, an old gold coin; **honnittad.i** = a kind of brass which has the appearance of gold (Te.) **somn.a** = gold (Pkt.); son.n.a = golden (Pali); suvarn.a = of bright colour, golden (RV); gold (AV); sovnakay, so_nakai, **somnakay** = gold (Gypsy)(CDIAL 13519) **soni** = jeweller (Bi.)(CDIAL 13623).

m1181A2222 Pict-80: Three-faced, horned person (with a three-leaved pipal branch on the crown), wearing bangles and armlets and seated, in a yogic posture, on a hoofed platform Glyph: **camman.am**, cappan.am = sitting cross-legged (Ta.); camman.am = id. (Ma.)(DEDR 2350).

Glyph: **saman.a** = ascetic (Pali.Pkt.); s'raman.a, s.aman.a (KharI.); **s'raman.a** = ascetic, religious mendicant (S'Br.)(CDIAL 12683). Root: s'ram = weary (Skt.); **s'rama** = labour (RV)(CDIAL 12682). Thus, s'raman.a can be semant. interpreted as a worker, a labourer. In the context of **samanom** 'gold' (Santali), s'raman.a may be elaborated as a goldsmith. Such an artisan can be represented glyptically by an ascetic, or a yogi in penance (as a horned person seated on a platform).

He sits on a platform (man.d.apa).

Rebus: **man.d.a_** = warehouse, workshop (Kon.lex.) *man.n.u* to do, perform, adorn, decorate, polish (Ta.); *man.ai* to create, fashion (Ta.); *manayuka, maniyuka* to fashion, form earthenware, make as a potter (Ma.)(DEDR 4685). *man.i* jewel of office (Skt.); *man.iyam* office of the village headman (Ta.); superintendence of temples, palaces, villages (Ma.); *man.e.v, man.ye.v* the office of monegar (Ko.); *man.iya, man.iha, man.eya, man.e* superintendence of temples, maths, palaces, custom-houses (Ka.); *man.iga_re* revenue inspector (Tu.); *man.iyamu* office or duties of the manager of a temple (Te.)(DEDR 4674).

Glyph: seated: *asan man.d.ao* 'to sit tailor-wise for a long time, to sit about with nothing to do; lazy; to lie down, as an animal in its lair'; *asan man.d.ao akanae, hokrho kan leka* 'he has taken up his position as if he were a watchman' (Santali) *mat.ku* squat, squab, fat and short (Santali) *asan man.d.ao, pat.gan.d.o* to squat, to sit tailorwise (Santali) *man.t.i* kneeling on one knee as an archer (Ta.); *man.tuka* to be seated on the heels (Ma.); *man.d.i* what is bent, the knee (Ka.); knee (Tu.); kneeling on one knee (Te.); *men.d.a_, mind.a* knee (Go.); *med.a, men.d.a* id. (Kond.a); *mend.a* id. (Pe.KuiKuwi); *mand.u_ki* part of elephant's hind leg; *met.* knee-joint (M.)(DEDR 4677). **man.d.i** = kneeling position (Te.lex.) mandil, mandir = temple (Santali) ma_d.a = shrine of a demon (Tu.); ma_d.ia = house (Pkt.); ma_l.a a sort of pavilion (Pali); ma_l.ikai = temple (Ta.)(DEDR 4796).

Glyph: platform: *man.d.hwa, man.d.ua, man.d.wa* 'a temporary shed or booth erected on the occasion of a marriage'; *man.d.om* 'a raised platform or scaffold'; *ma~r.om* 'a platform, used to keep straw on, or from which to watch crops' (Santali) *man.ai* low wooden seat, low earthen dais,

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wooden base of cutting instyruments, footstool (Ta.); *man.i*, *man.e* stool, low bench, seat (Ka.); *man.e* low stool to sit upon (Tu.)(DEDR 4675).

He wears a waist-band.

Rebus: **karma_ras'a_la** = workshop of blacksmith (Skt.)

Glyph: **kamarsa_la** = waistband (Te.)

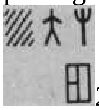
A twig adorns his head-dress.

ad.aru twig; ad.iri small and thin branch of a tree*; ad.ari* small branches (Ka.); *ad.aru* twig (Tu.)(DEDR 67). Cf. **at.artti** = thickly grown as with bushes and branches (Ta.) *d.ar a* branch; *dare* a tree; a plant; to grow well; ban: *darelena* it did not grow well; *toa dare* mother, the support of life (Santali)

Sign 99 : **at.ar** a splinter; *at.aruka* to burst, crack, slit off, fly open; *at.arcca* splitting, a crack; *at.arttuka* to split, tear off, open (an oyster)(Ma.); *ad.aruni* to crack (Tu.)(DEDR 66)

Rebus: **aduru** 'native metal' (Ka.)

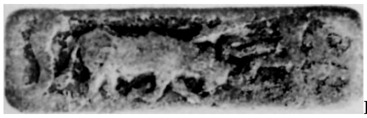
(DK 8165); after Mackay

Person throwing a spear at a buffalo and placing one foot on the head of the buffalo. 2279 seal impression, Mohenjodaro 1938: pl.88, no.279

The act of throwing a spear may be connoted by lexemes: **d.an:gara, d.a_n:gara** = throwing (Skt.lex.) Also, **ad.arincu, ad.arucu** *caus.* of ad.a.ru = to shoot as a missile (Te.)

homa = bison (Ko.)

soma = electrum (Skt.); hom = gold (Ka.)

m0492Ct 2835 Pict-99: Person throwing a spear at a bison and placing one foot on the head of the bison; a hooded serpent at left. [substantive: *bakher* 'homestead'. glyph: *phan.i* 'hood of cobra'; substantive: *pan.e* stone quarry. In thie context of *bail* ox; rebus: *bali* (iron ore), iron stone quarry].

Rebus: **na_ga** = lead (Skt.) Glyph: na_ga = snake (Skt.)

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kolsa = to kick the foot forward, the foot to come into contact with anything when walking or running; **kolsa pasirkedan** = I kicked it over (Santali.lex.)

kola = killing, e.g. a_d.ukola = woman-slaying (Te.) Thus, **homa kola** = bison slaying. Rebus: **hom** = gold (Ka.) **kol** =metal (Ta.)

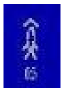
Sibri-damb01A

Sibri-damb01B

Tepe Yahya. Rectangular steatite (?) stamp seal with perforated knob on the back with lines crossed from corner to opposite corner. Impression on a pottery sherd of a Harappan seal of a type illustrated by Joshi and Parpola (Joshi and Parpola 1987: 88-100). Lamberg-Karlovsky and Tosi 1973: fig. 121.

kulhi = village street (Santali)

Seal showing a horned tiger. Mohenjodaro. (After Scala/Art Resource). Also, showing a ‘lid’ glyph.

Sign 65  Fish glyph is ligatured with a ‘lid’ glyph. **d.aren-**mund.i lid of pot; **d.aren, ad.aren** to cover up pot with lid (Bond.a); d.arai to cover (Bond.a.Hindi) Rebus: **aduru** ‘native metal’ (Ka.), i.e. **bed.a** ‘fish’, ‘hearth’ for native metal. The lid ligature (as an inverted V) can occur by itself as on the Dholavira signboard.

kundan = pure gold (G.Persian); the socket of a gem (G.) **kundanamu** = fine gold used in very thin foils in setting precious stones; setting precious stones with fine gold (Te.lex.) **kundamu** = one of the seven nidhi-s of Kubera (Te.) **kunda** = a city of vidya_dhara-s (Pkt.lex.) kuntan-am = interspace for setting gems in a jewel; fine gold (Ta.); kundan.a = setting a precious stone in fine gold; find gold; kundana = fine gold (Ka.); kundan.a = pure gold (Tu.)

kunda_r turner(A.); **ku~da_r, ku~da_ri** (B.); **kunda_ru** (Or.); **kundau** to turn on a lathe, to carve, to chase; **kundau dhiri** = a hewn stone; **kundau murhut** = a graven image (Santali) **kunda** a turner's lathe (Skt.)(CDIAL 3295).[1]

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[1] **kundakara** turner (Skt.); kunda_r (A.); ku~da_r, ku~da_ri (B.); kunda_ru (Or.); ku~dera_ one who works a lathe, one who scrapes (H.); ku~deri_ f.; ku~derna_ to scrape, plane, round on a lathe (H.)(CDIAL 3297). gud.i-ga_r-a a turner, one whose occupation is to form wooden articles (also the plaything called cakra, hubble-bubbles, etc.) with a lathe and to cover them with shellac of different colours; gud.ugud.i ma_d.uvavanu id. (Ka.)(Ka.lex.) ku~dnu to shape smoothly, carve (N.); kund lathe (A.); kundiba to turn and smooth in a lathe (A.); **ku~d** lathe (B.); ku~da_, ko~da_ to turn in a lathe (B.); ku~_nda lathe (Or.); ku~diba_, ku~_diba_ to turn (Or. > ku~_d lathe (Kur.); kund brassfounder's lathe (Bi.); kunna_ to shape on a lathe (H.); kuniya_ turner (H.); kunwa_ turner (H.)(CDIAL 3295). Wood-worker: cundaka_ra turner (Pali); cuna_ro maker of wooden vessels (Ku.); cuna_ro, cana_ro, cu~da_ro id. (N.)(CDIAL 4862). cunda wood or ivory work (Skt.); ivory

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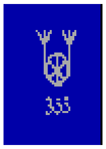
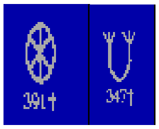
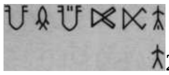
  Sign 355 seems to ligature sign 347 and sign 391 (Sign 391 depicts the opening in the nave or hub of wheel and also six spokes: **ara_)** **kund** opening in the nave or hub of a wheel to admit the axle (Santali) **kund ruka** = a gouge, a chisel with which circular holes are made in wood; **sagar. kund** = the opening in the nave of a wheel to receive the axle (Santali.lex.)

m0304AC 2420

kundavum = a manger, a hay-rick (G.lex.) **kundhavum** = a heap of hay or sticks (G.lex.) **kuntam** = haystack (Ta.); kuttar-i = a stack, a rick (Ka.)(DEDR 1724). [Note the haystack on the stool on which a person sits].

ku~d. = basin (G.)

kunda = a pillar of bricks (Ka.); pillar, post (Tu.Te.); block, log (Malt.); **kantu** = pillar, post (Ta.)(DEDR 1723). **kunda** = a post or pillar (Te.)

kun.d. = a pit (Santali) **kun.d.amu** = a pit for receiving and preserving consecrated fire; a hole in the ground (Te.) **kun.d.am, kun.d.a** sacrificial fire pit (Skt.) **kun.d.a** an altar on which sacrifices are made (G.)[6] **gun.d.amu** fire-pit; (Inscr.)

kun.d.i_ = chief of village. **kun.d.i-a** = village headman; leader of a village (Pkt.lex.)

me_d.hramu = the penis (Te.lex.) [Note the penis on the horned seated person].

me~r.he~t iron; ispat m. = steel; dul m. = cast iron; kolhe m. iron manufactured by the Kolhes (Santali); mer.ed (Mun.d.ari); **med.** (Ho.)(Santali.lex.Bodding)

me_r.sa = v.a. toss, kick with the foot, hit with the tail (Santali.lex.) cf. me_s.a = goat (Skt.lex.)

med.h = the helper of a merchant (Pkt.lex.) me_t.i, me_t.ari = chief, head, leader, the greatest man (Te.lex.) ?med.i (EI 9), also called meli, a kidnapper of victims for sacrifices (IEG). mehara = (EI 33) a village headman (IEG). mehto [Hem. Des. med.ho = Skt. Van.ik saha_ya, a merchant's clerk, fr. mahita, praised, great] a schoolmaster; an accountant; a clerk; a writer (G.lex.) mel. = tallying, balancing of accounts; a cash book; mel.van. = a mixture, a composition; mixing (G.lex.) me_r..iyar = pu_vaiciyar, ve_l.a_l.ar, i.e. agriculturists, traders (Ta.lex.)

d.ab, d.himba, d.hompo 'lump (ingot?)', clot, make a lump or clot, coagulate, fuse, melt together (Santali) **d.himba** = become lumpy, solidify; a lump (of molasses or iron ore, also of earth); **sadaere kolheko tahe_kanre d.himba me~r.he~t reak khan.d.ako bena_oet tahe_kana_** = formerly when the Kolhes were here they made implements from lumps of iron (Santali)

darap, dorob, dorob 'metal, excluding iron, money, wealth'; *dorobos* all the necessaries of life (Santali)

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worker (Pali); cundiba_ to do woodwork (Or.)(CDIAL 4861). **kuni ruka** a gouge (Santali.lex.) **ks.no_tra** whetstone (RV. ii.39.7)(Vedic.lex.)

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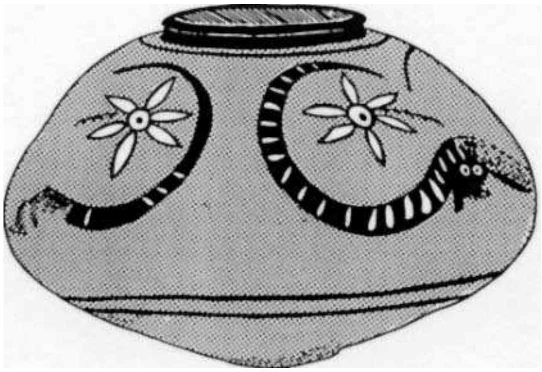
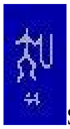
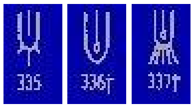
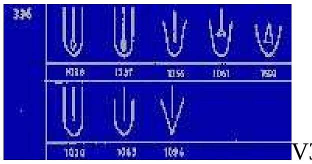


d.abe, d.abea ‘large horns, with a sweeping upward curve, applied to buffaloes’; d.abea kad.a = a buffalo with large curved horns; d.abe deren = horns as described (Santali)

Buffalo-horned face. Painting on a jar. Kot Diji. C. 2800-2600 BCE [After Khan 1965] **mu~he~** = face; rebus: **mu~ha_** = quantity of iron smelted at one time in the earthen furnace of the Kolhes; mu~ha_ me~r.he~t = iron smelted by the Kolhes and formed into an equilateral lump a little pointed at each of four ends (Santali)

Sign 44 **d.abe** = adj. bandy-legged (with knees a little bent)(Santali)

V336

V337 Signs 335, 336, 337 **d.abu** ‘an iron spoon’ (Santali)

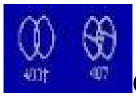
Rebus: **cul.l.ai** = potter’s kiln, furnace (Ta.); cu_l.ai furnace, kiln, funeral pile (Ta.); cul.l.a potter’s furnace; cu_l.a brick kiln (Ma.); culli_ fireplace (Skt.); culli_, ulli_ id. (Pkt.)(CDIAL 4879; DEDR 2709).

The face is depicted with bristles of hair, representing a tiger’s mane. The seated person’s face is , thus, like a tiger’s mane: **cu_r.i**

cu_d.a_, cu_la_, cu_liya_ tiger’s mane, topknot, peacock;’s crest (Pkt.); cula_ hair of head, lock, headdress (B.); cu_r. topknot, ceremony of tonsure (H.)(CDIAL 4883). Grapheme: **cur.a** a pinnacle, spire, crest (Santali) **cu_d.a_** = topknot on head; cu_lika_ cockscomb (Skt.)

The person wears bangles on his arms, from wrist to fore-arm.

Glyph: **cu_d.a** = bracelet (Skt.); cu_d.a, cu_laa bracelet (Pkt.);. cu_r.o (S.); cu_r., cu_r.a_ (L.P.); cur.o (Ku.); curo, curi (N.); suri_ a kind of ornament (A.); cu_r., cur.a_ bracelet (B.); cu_r.i_ (Or.Mth.); cu_ra_ anklet, bracelet (OAw.); cu_r.a_ ring on elephant’s tusk, bracelet; cu_r.i_ bangle (H.); cu_r., cu_r.i_, cu_r.o (G.); cud.a_ (M.)(CDIAL 4883). chur. bangle, bracelet (P.) chhura_ (P.) tsud.o, tsude.a_ (Kon.); suri, surye (Kon:kan.i) [Note the glyph of a horned, seated person wearing bracelets from wrist to forearm]

Glyph**: cur.i** a bracelet, a bangle (Santali)
Glyph: millstone: **san:ghat.i** = a millstone, that crushes (Ka.)

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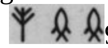
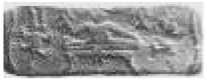
There are other objects with epigraphs with a comparable motif of a yogi.

Unprovenanced Harappan-style cylinder seal impression; Musee du Louvre; cf. Corbiau, 1936, An Indo-Sumerian cylinder, *Iraq* 3, 100-3, p. 101, Fig.1; De Clercq Coll.; burnt white agate; De Clercq and Menant, 1888, No. 26; Collon, 1987, Fig. 614. A hero grasping two tigers and a buffalo-and-leaf-horned person, seated on a stool with hoofed legs, surrounded by a snake and a fish on either side, a pair of water buffaloes. Another person stands and fights two tigers and is surrounded by trees, a markhor goat and a vulture above a rhinoceros. Text: 9905 Prob. West Asian find

Pict-117: two bisons facing each other.



Mohenjo-daro. Sealing. Surrounded by fishes, gharials? (monitor lizards) and snakes, a horned person sits in 'yoga' on a throne with hoofed legs. One side of a triangular terracotta amulet (Md 013); surface find at Mohenjo-daro in 1936. Dept. of Eastern Art, Ashmolean Museum, Oxford.

ka_ruvu = mechanic, artisan, Vis'vakarma, the celestial artisan (Te.); -ga_re = affix of noun denoting one who does it, e.g. samaga_re = cobbler (Tu.); garuva (Ka.); gar_uva = an important man (Te.) **garia** = in comp. Possessed of; doer or agent; badgaria = wise; bal garia = strong (Santali.lex.) gar [Skt. kr.; karavum = to do] a suffix found at the end of compounds, showing the 'doer of an action'; soda_gar = a seller; **ka_ri_-gar** = an artisan (G.lex.) If the pubes of the woman with spread out thighs are connoted by **kut.hi**, 'furnace'; the pictorial motif together with a foetus emerging out of the thights is intended to connote a furnace-artisan: **kut.hi-gar_uva** (pubes, foetus) or, alternatively: **kut.hi-garu** (furnace-mould).

ka_ruvu = mechanic, artisan, Vis'vakarma, the celestial artisan (Te.); **ga_re** = affix of noun denoting one who does it, e.g. samaga_re = cobbler (Tu.); garuva (Ka.); gar_uva = an important man (Te.) cf. **–ka_ra** *suffix*. 'worker' (Skt.)

Bristles, erection of hair of the body: **garu, gaguru** (Te.) [Note the imagery of bristles on the face of the seated person, almost looking like a tiger's mane. The tiger's mane is: **cu_l.a**; rebus: **cu_l.a** 'furnac, kiln' + bristles '**garu**'; rebus: **ga_re** 'important person, worker'; thus the composite glyph can be read as: **cu_l.a ga_re** 'furnace-kiln worker']. See also: Mane **ul.a** (IL 1240) **ur..a** = king's paraphernalia (Ma.)

karu = embossed work, bas-relief (Ta.); karukku (Ta.) karavi, karu, **garu** = a mould (Tu.) **karuvi** = tool (Ta.)[Thus, when tablets are embossed with glyphs to create objects in bas-relief, the artisan is trying to denote the nature of the function carried out by the **–ga_re** 'important person'; for example, when a tree is so depicted, it may represent **kut.hi ga_re** 'furnace worker'.]

Foetus **karuvu, karugu** (Te.) [Rebus: **-ga_re** 'important person, worker'. See the glyph of foetus emanating from a woman with her thighs spread out and lying upside down. **kut.hi** 'pubes'; rebus: kut.hi 'smelting furnace'; hence, the composite glyph connotes: **kut.hi ga_re** = furnace worker.]

Duplicated and paired glyphs

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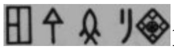
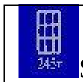
m0296 Two heads of one-horned bulls with neck-rings, joined end to end (to a standard device with two rings coming out of the top part?), under a stylized tree with **nine leaves**. 1387

A characteristic feature of use of glyphs to compose epigraphs is the duplication of glyphs or pairing of the same glyph. Some examples are:

1. Duplicated and paired one-horned heifer
2. Duplicated and paired shor-horned bull
3. Duplicated and paired antelope looking back
4. Duplicated and paired scorpions
5. Duplicated and paired fishes
6. Duplicated and paired bangles (or millstone)

The number of leaves are nine.

Substantive: **lo** ‘iron’ (Assamese, Bengali); *loa* ‘iron’ (Gypsy) Glyph: **lo** = nine (Santali); **no** = nine (B.) [Note the count of nine ‘ficus’ leaves depicted on the epigraph.] **loa** = *ficus glomerata* (Santali)

Sign 25 is a square with nine divisions.

Glyph: **lo** ‘nine’ (Santali) rebus: **loh** ‘iron, metal’ (Skt.); **khan.d.a** ‘division’ (Skt.); **kan.d.** = furnace, altar (Santali) lokhan.d. ‘iron, ironware, tools’ (G.) lo + khan.d. = rebus: loh ‘iron’ + kan.d. ‘furnace, altar’ (Santali)

The paired or duplicated glyphs can be explained by a lexeme: **san:gad.a** = two; san:gad.am double-canoe (Ta.); jan:gala (Tu.); **san:gala** pair; han:gula, an:gula double canoe, raft (Si.)(CDIAL 12859).

Rebus: **san:gha_d.o, saghad.i_ (G.)** = firepan; **saghad.i_, s'aghad.i** = a pot for holding fire (G.)[cula_ sagad.i_ portable hearth (G.)]

Thus, the pairing or duplicating a glyph is a way of connoting a **saghad.i_** ‘a portable hearth’ (G.)

Apart from a zebu, there are two other types of bulls depicted:

bali iron stone sand, iron ore (Santali)
bali bullock (Skt.)
damr.a a steer, a heifer (Santali)

ta_mbra copper (Ka.); **damr.i, dambr.i** one eighth of a pice (Santali) **damd.i_, damd.o** lowest copper coin (G.) **ta_mbad.a** copper plate; **ta_mbad.i_, ta_mbad.o** a copper pot; **ta_mbum** copper (G.)

h1018copperobject Head of one-horned bull ligatured with a four-pointed star-fish (Gangetic octopus?)

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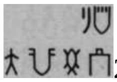
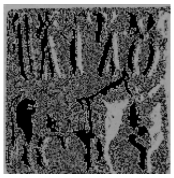
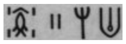
m0297a Head of a one-horned bull attached to an undentified five-point symbol (octopus-like?) 2641
ver.ha_ octopus, said to be found in the Indus (Jat.ki lexicon of A. Jukes, 1900)
Rebus: **med.** 'iron' (Mu.)

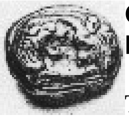
The two heads ligatured on m0296 are of heifers (young bulls).

That it is a heifer (and not some mythical bovine) is surmised from (1) a differentiated orthography when compared to an old ox looking down; and (2) an orthographic variant, depicting a bull with two horns which is depicted on Seals m1077 and m0232. Since the semantic accent is on the curved horn, only one horn is shown, **kod**., 'artisan's workshop'. Glyph: **kod.a_m** shells; kod.i_ a small cowry; kod.um a sea-shell; kod.o a large cowry (G.)

 m1077a 2359 m0232  2234 'Unicorn' with two horns! "Bull with two long horns (otherwise resembling the 'unicorn')", generally facing the standard. That it is the typical 'one-horned bull' is surmised from two ligatures: the pannier on the shoulder and the ring on the neck. [The existence of a two-horned 'unicorn' provides a reasonable basis to infer and decode the 'one-horned' bull as a young heifer.]

Out of a total of 2906 inscribed objects (according to Mahadevan concordance), the one-horned, young bull occurs on 1159 objects; on 900 of these objects, the young bull is shown in front of a standard device. If the inscribed objects 'without texts' are reckoned, the number of inscribed objects discovered according to Parpola concordance are 3692: Collections in India: 1537; Collections in Pakistan: 2138; West Asia: 17.

Late seventh century BCE Electrum Stater from western Turkey561-547 BCE Silver stater attributed to Croesus, King of Lydia (ca. 560-547 BC) (After Kurt Regling, 1959, *Ancient Numismatics*, Chicago, Argonaut Inc.)



Opposition between the Lion and the One-horned Bull depicted on early silver coins

The opposition beween the lion and the one-horned bull is a representation of **ara_** (war, lion); rebus: **ara** = copper (Akkadian). Damr.i 'copper, one-eighth of a pice' (Te. Santali); **damr.a** = heifer, steer (Santali)

Rebus: **damr.i** = copper; **tamb(r)a** = copper (Skt.); **tamba** = copper (Santali) Glyph: one-horned bull **damr.a** 'steer, heifer'

Each of the heifers has one horn.

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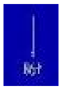
Glyph: **ko_t.u** = horns (Ta.) **ko_d.** (pl. ko_d.ul) horn (Pa.); **ko_t.u** (in cmpds. **ko_t.t.u-**) horn (Ta.); **ko.r.** (obl. **ko.t.-**) horns (one horn is **kob**), half of hair on each side of parting, side in game, line marked out (Ko.); kwi.r. (obl. kwi.t.-) horn (To.); **ko_d.u** horn (Ka.); **ko_r..** horn (Ka.); **ko_d.u** horn (Tu.); **ko_d.u** rivulet (Te.); **ko_r** (pl. **ko_rgul**) id. (Ga.); **ko_r** (obl. **ko_t-**, pl. **ko_hk**) horn of cattle or wild animals (Go.); **ko_r** (pl. **ko_hk**), **ko_r.u** (pl. **ko_hku**) horn (Go.); **kogoo** a horn (Go.); **ko_ju** (pl. **ko_ska**) horn, antler (Kui)(DEDR 2200).

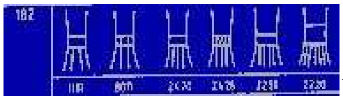
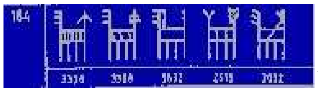
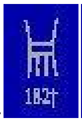
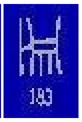
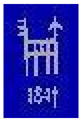
kot.iyum = a wooden circle put round the neck of an animal; **kot.** = neck (G.lex.) [cf. the orthography of rings on the neck of one-horned young bull]. **ko_d.iya, ko_d.e** = young bull; ko_d.elu = plump young bull; ko_d.e = a. male as in: ko_d.e du_d.a = bull calf; young, youthful (Te.lex.)

Glyph: **kod.a** = in arithmetic, one (Santali) [A long linear stroke as a glyph.  **Sign 86**]

Sign 402 **ko_d.i** = a kind of flag, an image of garud.a, basava, or other demi-god set upon a long post before a temple; cf. gud.i, temple (Ka.lex.)

Rebus: **kod.** = artisan's workshop (Kuwi) **kod.** = place where artisans work (G.lex.) **kod.** = a cow-pen; a cattlepen; a byre (G.lex.) gor.a = a cow-shed; a cattleshed; gor.a orak = byre (Santali.lex.) got.ho [Skt. kos.t.ha the inner part] a warehouse; an earthen vessel in wich indigo is stored (G.lex.) kot.t.amu = a stable (Te.lex.)

An earthworm is flanked by two antelopes. Lothal123A Lothal123B (So-called Persian gulf seal).

 V182  V184    Signs 182, 183, 184 The sign 182 is used on a copper plate epigraph and substitutes for an 'antelope' glyph.

Stamp seal, large ibex walking left MS on black steatite or chlorite, North Syria or Anatolia, 4th millennium BC, 1 rectangular gabled stamp seal, 4,7x5,1x1,3 cm, pierced through. *Provenance:* 1. Erlenmeyer Collection, Basel (before 1958-1981); 2. The Erlenmeyer Foundation, Basel (1981-1997); 3. Sotheby's 12.6.1997:8

kallan mason (Ma.); *kalla* glass beads (Ma.); *kalu* stone (Kond.a); *xal* id., boulder (Br.)(DEDR 1298).

Tarakai Qila01A Tarakai Qila01B

kala stag, buck (Ma.); *kal a.r.* Nilgiri ibex (Ko.); *kalai* stag, buck, male black monkey (Ta.); *kalan:kompu* stag's horn (Ta.)(DEDR 1312)

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er-r-a = an earthworm; **era** a bait, food (Te.lex.).

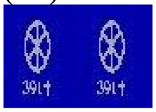
era_ = claws of an animal that can do no harm (G.)

Substantive: **dha_tu** 'mineral' (Vedic); a mineral, metal (Santali); *dha_ta* id. (G.) tan.t.ava_l.am = cast iron, iron rail, girder (Ta.); tan.d.ava_l.a cast iron (Ka.)(DEDR 3050).
Glyph: **d.ato** 'claws or pincers (chelae) of crabs'; d.at.om to seize with the claws or pincers, as crabs, scorpions (Santali)

Rebus: **ere** 'a dark-red or dark brown colour, copper' (Ka.); eruvai copper (Ta.)(DEDR 817). era, eraka = copper (Ka.) mlekh = antelope; melukka **=** copper. What is depicted is Meluhha copper.

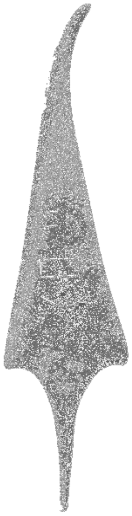
Sign 391 **era, er-a** = eraka = ?nave; **era**ko_lu = the iron axle of a carriage (Ka.M.); cf. irasu (Ka.lex.)

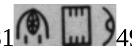
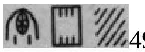
Metal: **arka** = copper (Skt.) **erka** = ekke (Tbh. of arka) aka (Tbh. of arka) copper (metal); crystal (Ka.lex.) **araka** = sublimation, sublimate (Ka.); arka id. (M.) **erako** molten cast (Tu.lex.) agasa_le, agasa_li, agasa_lava_d.u = a goldsmith (Te.lex.) akka, aka (Tadbhava of arka) metal; akka metal (Te.)

 When reduplicated, this may be read as: **erako** 'nave' **san:gala** 'pair'; rebus: **erako** 'molten cast' **san:gad.a** 'furnace'. As distinct from non-melted native metal, aduru.

This may explain the multiple use of the glyph on Dholavira signboard.

Sign 393 occurs on two copper 'daggers' from Harappa (the inscriptions -- 4901 and 4902 -- are the lists of 'property' items owned).



h3814901 Bronze dagger h380 4902 Bronze dagger

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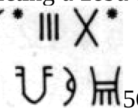
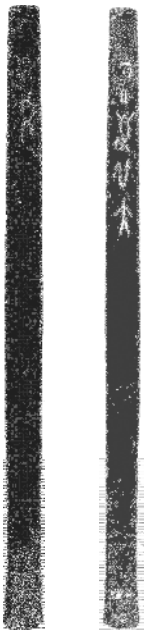
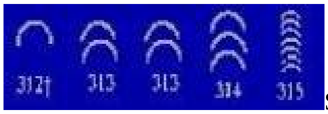
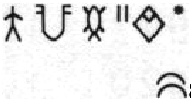
The first sign begins with Sign 393 and the third sign [**)** ligatured with an 'eye-ball'] is the same as that shown on Chanhudaro inscription 6306 incised on both sides of a bronze tool; the inscription includes a graphemic **)** sign without the 'eye-ball'; two other examples are on m257a seal, depicting a zebu bull as a field symbol and on inscription which is incised on a Harappan bronze weapon or tool 5601



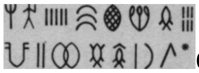
The X on line 1 (top line) and the first sign of line 2 (bottom line) is relatable to the signs incised on two tin ingots (each weighing about 11 kgs.) found from an ancient (ca. 1400 BC?) ship-wreck at Haifa, Israel -- the sign apparently connotes the nature of the 'alloy or metal' used. The first sign of line 2, inscription 5601 (Sign 182) may also be a variant an animal pictograph, the wild goat, **tagara** **or ba~ont.ia**, a species of deer; rebus: **bat.i** = oven (Santali.lex.) The ligatures Sign 184 may be a specific bat.i = can.d.bol bat.i = tail + furnace = refined silver furnace.

Signs 312 to 315

The inverted U sign also occurs on one side of Kalibangan k121A and B inscribed bronze rod

Kalibangan121A, B 8302

See Chanhudaro bronze tool: Inscription 6306 incised on two sides c040 a,b; the cross-hatched oval sign follows the sign three inverted U-s:

Chanhudaro40A Chanhudaro40B 6306 The first line of this incription 6306 (which includes the three inverted U signs ligatured one on top of another) is incised on one side of copper tool.

Signs 313-317, 393+variants

kumpat.i = ban:gala = an:ga_ra s’akat.i_ = a chafing dish, a portable stove, a goldsmith’s portable furnace (Te.lex.)

kumme = a dent, a notch, depression (Te.lex.)

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2134.Image: dome, arch: gumat.a, gumut.a, gumuri, gummat.a, gummut.a a copula or dome (Ka.); ghumat.a (M.); gummat.a, gummad a dome; a paper lantern; a fire-baloon (H.Te.); **kummat.t.a** arch, vault, arched roof, pinnacle of a pagoda; globe, lantern made of paper (Ta.)(Ka.lex.); gumat.a a high, huge figure of stone, representing a Jaina saint (Ka.); gummat.e id. (Tu.)(Ka.lex.) kumbutalaya place of an elephant's frontal globes (Si.)(CDIAL 3314).

h176A

h176bb

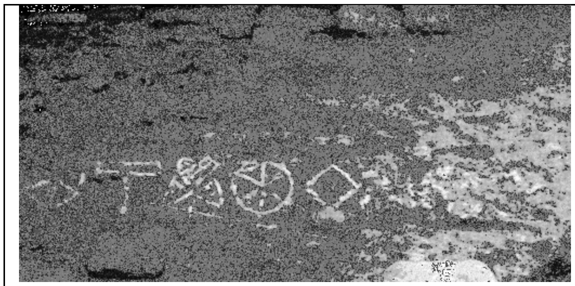
4303 Tablet in bas-relief h176a Person standing at the center between a two-tiered structure at R., and a short-horned bull (bison) standing near a trident-headed post (or holding a rimless pot on his left hand) at L. h176b From R.—a tiger (?); a seated, pig-tailed person on a platform; flanked on either side by a person seated on a tree with a tiger, below, looking back. A hare (or goat?) is seen near the platform.

kand.o seal, stool (Malt.); **kan.d.o_** a stool (Kur.)(DEDR 1179).

Word for Tin

trapus = tin (TS iv, 7,5,1); **cakra-sam.jn~a** = tin (Skt.); [trapu = tin (AV xi.3.8); Taittiri_ya Bra_hman.a iii.12,6,5; Jaimini_ya Upanis.ad Brahman.a III.17.3; Chan_ndogya Upanis.ad IV.17.7); trapu = tin in enumeration of metals: Ka_t.haka Sam.hita_ xviii.10; Maitra_yan.i_Sa.hita_ii.11.5; Va_jasneyi Sam.hita_, xviii.13]

The Sanskrit lexeme cakra sam.jn~a connoting tin points to an early use of heiroglyphs to represent minerals and metals. Since **kana** (perhaps connoting copper or compounds occurring naturally) represented by a rhombus-corner is to be distinguished from molten cast copper together with tin, a cakra sign was used; the sign is given by the lexeme which connotes the knave of a wheel: **era. Hence, the term cakra sam.jn~a = lit. symbol of wheel.**



Signboard on the North Gate leading to the walled citadel. Dholavira. Courtesy ASI.
There is a glyph common to the Dholavira sign board, to the epigraph on the horned-tiger seal and the glyph on the button seal of Harappa. The glyph is a 'lid, cover' for a pot: ^ Lexemes: **ad.aren, d.aren** lid, cover (Santali) Rebus: **aduru** 'native metal' (Ka.). It is possible to unravel many substratum lexemes of **Mleccha** (**Meluhhan**) and at the same time, decode the epigraphs; the key is to unravel the dialectical continuum of the linguistic area circa 5500 years Before Present. Since the cultural traits of the civilization which evolved about 5500 years Before Present are present even today in Bharat, the languages of Bharat constitute the data set for decoding lexemes of such a dialectical continuum. A remarkable cultural trait which continues into the historical periods of Bharat is the use of copper plates to record epigraphs as property transactions. The epigraphs are the artifacts created by artisans of the Sarasvati civilization, the metal workers who recorded the ownership of the furnaces and trade in a civilizational resource: stones, metals and minerals. This hypothesis on language, writing system and function served by the epigraphs, will be tested further in a separate volume of the Saptathi Sarasvati, the septet of 7 volumes on Sarasvati.

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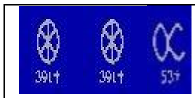
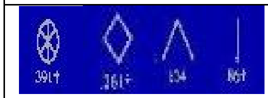
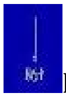
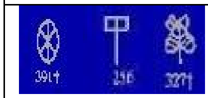
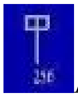
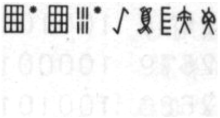
The signboard glyphs can be divided into three segments:

	**erako san:gad.a** ‘molten cast furnace’; **d.ato** ‘claws’; **dhatu** ‘ore’
	**erako khu~t. ad.aren kod.** ‘copper, furnace (smelter pit), native metal, workshop. Glyph: **kod.a**, ‘one’; rebus: **kod.**, ‘artisan’s workshop’. Glyph: **khu~t.,** ‘corner’; rebus: **kun.d.amu** = a pit for receiving and preserving consecrated fire; a hole in the ground (Te.) Glyph: **ad.aren, d.aren** ‘lid’; rebus: **aduru** ‘native metal’
	**erako khut.i kamar.** ‘copper, furnace, mint **[**portable furnace for precious metals – **kamat.amu] kamar** ‘blacksmith’ (Santali). Glyphs: erako (nave) + **khut.i** (pin) + lo kamat.ha (ficus leaf) = Rebus: **erako** ‘molten cast’ + **khut.i** ‘furnace’ + lo kamat.ha ‘metal mint: **kammat.a**’ [**khut.i** Nag. (Or. **khut.i_**) diminutive of **khun.t.a**, a peg driven into the ground, as for tying a goat (Mundari.lex.) **khu~t.i_** wooden pin (M.)(CDIAL 3893)] Alternative**: tamire** = the pin in the middle of a yoke (Te.) Rebus: **tavara** = tin (Te.Ka.)

Two antelopes have their heads turned looking back.

Glyphs: tiger, antelope looking back, waist-zone (pannier): smith, smithy

 **m0488ct** m0272 2554

Glyph: **krem** = the back (Kho.)(CDIAL 2776). **krammar-a =** to turn, return (Te.); **krammar-ilu, krammar-illu, krammar-abad.u =** to turn, return, to go back; krammar-u = again; krammar-incu = to turn or send back (Te)

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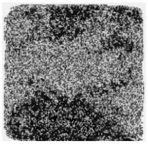
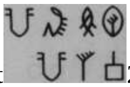
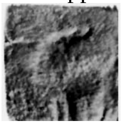
 m1452Act m1452Bct2912 (Similar imagery of an antelope looking back appears on m-1448 to m-1452).

 m0438atcopper Goat-antelope with horns bending backwards and neck

kamar kidin a small species of scorpion; *kidin, kidin kat.kom* a scorpion; *kidin marmar* a species of centipede (Santali)

Rebus: **kamar** = blacksmith (Santali)] Rebus: **kamar** = blacksmith (Santali) **ka_rma_ra** = metalsmith who makes arrows etc. of metal (RV. 9.112.2: **jarati_bhih os.adhi_bhih parn.ebhih s'akuna_na_m ka_rma_ro as'mabhih dyubhih hiran.yavantam icchati_**) kammar-a, kamma_r-a, kammaga_r-a, **karma_ra, karmaka_ra, kammaga_r-a, kamba_r-a** = one who does any business; an artisan, a mechanic; a blacksmith (Ka.) **kamma_l.a** = an artisan, an artificer: a blacksmith, a goldsmith (Ta.Ka.); a goldsmith (Ka.) kammara = the blacksmith or ironsmith caste; kammaramu = the blacksmith's work, working in iron, smithery; kammarava_d.u, kammari, kammari_d.u = a blacksmith, ironsmith; kammarikamu = a collective name for the people of the kamma caste (Te.) kabbin.a, kabban.a, kabbuna, karbuna = Te. inumu, Ta. irumbu; the dark-coloured, black metal: iron (Ka.)

The most frequently occurring glyph is that of a one-horned bull with a pannier; it occurs on 1159 epigraphs (according to Mahadevan corpus). The orthographic accent is on the waist-zone, the pannier.

Glyph: **kamarasa_la** = waist-zone, belt (Te.) kammaru = the loins, the waist (Ka.Te.M.); kamara (H.); kammarubanda = a leather waist band, belt (Ka.H.) kammaru = a waistband, belt (Te.) kammarincu = to cover (Te.) kamari = a woman's girdle (Te.) komor = the loins; komor kat.hi = an ornament made of shells, resembling the tail of a tortoise, tied round the waist and sticking out behind worn by men sometimes when dancing (Santali) kambra = a blanket (Santali)

m1656 On this petoral, the pannier is vividly displayed. This is an orthographic feature unique to the one-horned heifer. It is a phonetic rebus determinative of the artisan's workhop. **kamma_r-asa_le** = the workshop of a blacksmith (Ka.); **kamasa_lava_d.u** = a blacksmith (Te.) kamba_r-ike = a blacksmith's business (Ka.) **kamarsa_ri_** smithy (Mth.)

Glyph: overflowing jar as on the pectoral: **bat.i** trs. To overturn, to overset or ovethrow; to turn or throw from a foundation or foothold; to turn on the ground to any extent, or roll; **uaurbat.i**, to upset or overthrow by shoving or pushing; mabat.i to overturn by cutting, to fell trees; **bat.i-n** rflx. v., to lay oneself down; **ba-p-at.i** repr. V., to throw each other; **bat.i-o** to be overturned, overthrown; ba-n-at.i vrb.n., the extent of the overturning, falling down or rolling; **bat.i-n** rlfx.v., to lie down; **bat.i-ar.agu** to bring or send down a slope by rolling; **bat.i bar.a** to roll again and again or here and there; **bat.i-bur** to turn over by rolling (Mundari.lex.)

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Rebus: **bat.i** ‘furnace’ (Santali)

Harappa. Two tablets. Seated figure or deity with reed house or shrine at one side. Left: H95-2524; Right: H95-2487.

On a terracotta image, a tiger is ligatured to a woman. In Nahali, **kola** means ‘woman, wife’. **kol** ‘tiger’ (Santali) Rebus, **kol** ‘metal’ (Ta.)

Slide 185 Molded terracotta tablet (H2001-5075/2922-01) with a narrative scene of a man in a tree with a tiger looking back over its shoulder. The tablet, found in the Trench 54 area on the west side of Mound E, is broken, but was made with the same mold as ones found on the eastern side of Mound E and also in other parts of the site (see slide 89 for the right hand portion of the same scene). The reverse of the same molded terra cotta tablet shows a deity grappling with two tigers and standing above an elephant.

kola, kolum = a jackal (G.) **kolhuyo** (Dh.Des.); **kulho, kolhuo** (Hem.Des.); **kros.t.r.** (Skt.) kul seren = the tiger’s son, a species of lizard (Santali) **kolo**, kolea_ jackal (Kon.lex.) Jackal: kur..i-nari jackal (Kur-r-a_. Tala. Ve_t.an-valam. 13)(Ta.); id. (Ma.)(Ta.lex.) kul tiger; kul dander den of tiger; an.d.kul to become tiger; hudur. to growl as tiger; maran. d.at.kap kul a big-headed tiger (Santali.lex.) ko_lupuli = a big, huge tiger, royal or Bengal tiger; ko_lu = big, great, huge (Te.lex.) kula tiger; syn. of maran: kula, burukula, kamsikula, the striped royal tiger; syn. of maran: kula, lar.okula, the brown royal tiger without stripes; syn. of hur.in: kula, soncita, leopard: sin:kula = the lion; kindorkula, kinduakula = the panther; tagukula (lit. the shaggy tiger), the hyena; d.urkula, a smaller feline animal, which when attacking a man bites him in the knee, probably a tiger-cat; kula-bin: collective noun for all dangerous animals; kulabin:-o to become infested by dangerous animals; kla (Khasi.Rongao) tiger (Mundari.lex.) kros.t.r. = jackal (RV.); kro_s.t.u = id. (Pa_.n.); kro_s.t.r. = crying (BhP.); kot.t.hu, kot.t.huka, kotthu, kotthuka = jacka (Pali); kot.t.hu (Pkt.); kot.a (Si.); kot.iya = leopard (Si.); ko_lhuya, kulha = jackal (Pkt.); kolha_, kola_ jackal; adj. crafty (H.); kohlu~, kohlu_ jackal (G.); kolha_, kola_ (M.)(CDIAL 3615). Fr. krus’ = cry, call; kro_s’ati cries out (RV)(CDIAL 3613). Kot.ho = a call, a messenger; kot.ha invitation; kot.han.u = to send for (S.)(CDIAL 3614). Kos’ to abuse, curse, blame (Gypsy); kosna_ to curse (H.); kosn.a_ (P.); akos’ to abuse (Gypsy); kros’ati cries out (RV)(CDIAL 3612). kros’a shout (VS); kuru_ voice, word (Pas’); kosa_ curse (H.)(CDIAL 3611). **kul.** = the tiger, filis tigris; kul en:ga = tigress; *kul seren* ‘the ‘tiger’s song’, a species of lizard (Santali)

kola foetus (OMarw.)(CDIAL 3607). **kola** = foetus; **kor.o** bosom, breast (S.); kurouru breast (Dm.); kor.i_ breast of a quadruped (L.); koli_ chest of an animal (L.)(CDIAL 3607). kol breast, bosom; kaula_, kola_, kauli_ id., lap (H.); kro_d.a breast, bosom (AV.); ko_la breast, lap (Skt.prob. MIA.); kor.o bosom, breast (S.); kor.i_ breast (S.); kor.i_ breast of a quadruped (L.); kor.a lap (Or.); kor lap (Mth.); kora_ id. (Bhoj.); kor womb (H.); kol. lap (M.); ko_la breast, bosom (Pkt.); koli_ chest of an animal (L.); kol womb (Ku.); lap (B.); kol, kola_ lap, hip on which children are carried (A.); kol.a lap (Or.)(CDIAL 3607). kalalam < kalala thin membrane covering the foetus (Cu_ta. Ja_n-a. 10,9)(Ta.lex.)

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On m0488 tablet, the tiger stands beneath a tree; on the branch of a tree, a spy is seated. The word for spy is: **heraka** (Pkt.); rebus: **eraka** = copper (Ka.). The tree is **kut.i**; rebus: **kut.hi** ‘furnace’ (Santali); the branch of a tree is **ad.aren** (Santali); rebus: **aduru** ‘native metal’ (Ka.). Slide 205 Faience tablet or standard. This unique mold-made faience tablet or standard (H2000-4483/2342-01) was found in the eroded levels west of the tablet workshop in Trench 54. On one side is a short inscription under a rectangular box filled with 24 dots. The reverse has a narrative scene with two bulls fighting under a thorny tree. **eraka, hero** = a messenger; a spy (G.lex.) he_raka = spy (Skt.); e_ra = to spy (Kui); er = to see (Malt.); he_ru = spy (Pkt.); he_riu = spy (Kl.); hero (G.); heru~ spying (G.); hern.e~ to spy (M.); herna_ (H.); herai (Oaw.)(CDIAL 14165). heriya_m = prying, peeping; heravum = to spy (G.lex.) **ere** = to see, behold; erye to peep, spy (Malt.); **her** to look at or for (Pkt.); **er uk-** to play 'peeping tom' (Ko.); **e_ra** spying, scouting (Kui); he_ri kiyali to see (Kuwi); e_rna_ (i_ryas) to see, look, lok for (Kur.)(DEDR 903).

kut.i, kut.hi, kut.a, kut.ha a tree (Kaus'.); **kud.a** tree (Pkt.); **kur.a_** tree; **kar.ek** tree, oak (Pas;.)(CDIAL 3228). **kut.ha, kut.a** (Ka.), kudal (Go.) kudar. (Go.) **kut.ha_ra**, kut.ha, kut.aka = a tree (Skt.lex.) **kut., kurun:** = stump of a tree (Bond.a); khut. = id. (Or.) **kut.amu** = a tree (Te.lex.)

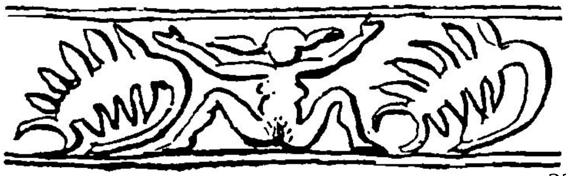
Terracotta female, Gumla; Terracotta miniature plough; Jawaiwala, Bahawalpur (Weiner, 1984, Figs. 187 and 188)

ukka_ ‘thigh’ (Vedic) **ukkalai** the hips (Ta.); **ukkal** (Ma.); **okkal, okkalai** hip side of the body (**Par..a. 290**); **okku** (Ma.)(Ta.lex.)

ukka_ ‘furnace’ (Skt.) was- = fireplace (To.)(DEDR 2857).
Furnace or forge of a smith; a goldsmith's smelting pot; torch: **ukka_** (Vedic ulka_ and ulkus.i_; Latin volcanus; Old Irish olca_n to be fiery) firebrand, glow of fire, torch; tin.-ukka_ firebrand of dry grass; **ukka_** a furnace or forge of a smith; a meteor; ukka_-dha_ra a torch-bearer; ukka_-pa_ta falling of a firebrand, a meteor; ukka_-mukha the opening or receiver of a furnace, a goldsmith's smelting pot = **kamma_r'uddhana** (Pali); ukka_cana_ enlightening, clearing up, instruction; ukka_cita enlightened, made bright; (fig.) or cleaned, cleared up; ukka_ceti to bale out water, to empty by means of buckets (Pali)(Pali.lex.) Image: fireplace: cf. cu_l.ai kiln, furnace, funeral pile (Ta.); culli_, ulli_ fireplace (Pkt.)(DEDR 2709)(CDIAL 4879). **huko, hukko** [Hem. Des. **ukka_** fr. Skt. **ulka_** a firebrand; Arabic **hukka** a casket] a smoking apparatus; a *hukkah* (G.) **huka** the hooka, the hubble bubble (Santali)

The most emphatic rebus representation of the pubes of a woman yields the homonym **kut.hi**

See http://www.hindunet.org/saraswati/smith/blacksmith.htm A symbolism of a woman spreading her legs apart, which recurs on an SSVC inscribed object. **Cylinder-seal impression from Ur showing a squatting female.** L. Legrain, 1936, *Ur excavations, Vol. 3, Archaic Seal Impressions*. [cf. Nausharo seal with two



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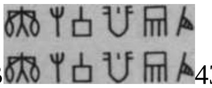
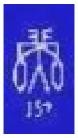
scorpions flanking a similar glyph with legs apart – also looks like a frog]. Fig. 95; Susa, stamp seal of bitumen compound, Louvre, MDAI, 43, no. 1725; a woman shown full-face is squatting with legs apart, possibly on a stool. (A similar image of a woman with legs spread out occurs on an Ur seal impression and on a Mohenjodaro tablet). (Not illustrated).

h180A h180B4304 Tablet in bas-relief h180a Pict-106: Nude female figure upside down with thighs drawn apart and crab (?) issuing from her womb[vii]; two tigers standing face to face rearing on their hindlegs at L. Pict-92: Man armed with a sickle-shaped weapon on his right hand and a cakra (?) on his left hand, facing a seated woman with disheveled hair and upraised arms.

kut.hi = pubes. **kola** 'foetus'[2] [Glyph of a foetus emerging from pudendum muliebre.] **kut.hi** = the pubes (lower down than pan.d.e) (Santali.lex.) kut.hi = the womb, the female sexual organ; sorrege kut.hi menaktaea, tale tale gidrakoa lit. her womb is near, she gets children continually (H. kot.hi_, the womb)(Santali.lex.Bodding) ko_s.t.ha = anyone of the large viscera (MBh.); kot.t.ha = stomach (Pali.Pkt.); kut.t.ha (Pkt.); kot.hi_ heart, breast (L.); kot.t.ha_, kot.ha_ belly (P.); kot.ho (G.); kot.ha_ (M.)(CDIAL 3545). **kottha** pertaining to the belly (Pkt.); kotha_ corpulent (Or.)(CDIAL 3510). Kot.ho [Skt. kos.t.ha inner part] the stomach, the belly (G.lex.)

The **bunch of twigs** = **ku_di_, ku_t.i_** (Skt.lex.) ku_di_ (also written as ku_t.i_ in manuscripts) occurs in the Atharvaveda (AV 5.19.12) and Kaus'ika Su_tra (Bloomsfield's ed.n, xliv. cf. Bloomsfield, American Journal of Philology, 11, 355; 12,416; Roth, Festgruss an Bohtlingk, 98) denotes it as a twig. This is identified as that of Badari_, the jujube tied to the body of the dead to efface their traces. (See *Vedic Index*, I, p. 177).

khut.i Nag. (Or. **khut.i_**) diminutive of **khun.t.a**, a peg driven into the ground, as for tying a goat (Mundari.lex.) khun.t.i = pillar (Santali.lex.)

Sign 12 (80) **kut.i** 'female water carrier' (Te.); rebus: **kut.hi** 'furnace'  is a ligature of kan.d.a kanka 'rim of pot' + kut.i 'water carrier'. Rebus: kan.d.a kanka 'altar for copper' + kut.hi 'metal furnace'.

The vivid use of the Sign 15 as a pictograph is found on m-1405: a person stands at the centre, points to a short-horned bull facing a trough, with his right hand and to the Sign 15, with his left hand.

[2] **ku_ti** = pudendum muliebre (Ta.); posteriors, membrum muliebre (Ma.); ku.0y anus, region of buttocks in general (To.); ku_di = anus, posteriors, membrum muliebre (Tu.)(DEDR 188). ku_t.u = hip (Tu.); kut.a = thigh (Pe.); kut.e id. (Mand.); ku_t.i hip (Kui)(DEDR 1885). gu_de prolapsus of the anus (Ka.Tu.); gu_da, gudda id. (Te.)(DEDR 1891).

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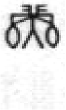
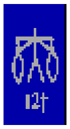
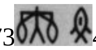
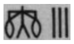
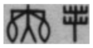
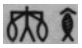
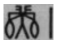
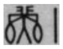
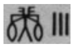
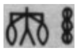
m1405At Pict-97: Person standing at the center pointing with his right hand at a bison facing a trough, and with his left hand pointing to the sign 
[*bali* ‘bull’; *bali* ‘iron’; *tagar.* ‘trough’; *tagara* ‘tin’; *kan.d.kanka* ‘rim of pot’; **kan- kand.** ‘copper-furnace’; **kut.i** ‘woman water-carrier’ (Te.); rebus: **kut.hi** = furnace; alternative: *kol.i* ‘water-carrier’; *kolhe* ‘smelters of iron’.]

Sign 12 **kut.i** = a woman water-carrier (Te.) kut.i = to drink; drinking, beverage (Ta.); drinking, water drunk after meals (Ma.); kud.t- to drink (To.); kud.i to drink; drinking (Ka.); kud.i to drink (Kod.); kud.i right, right hand (Te.); kut.i_ intoxicating liquor (Skt.)(DEDR 1654).
Obverse: A tiger and a rhinoceros in file.
m1405Bt Pict-48 A tiger and a rhinoceros in file [*kha~g* ‘rhino’; rebus: *kan:gar* ‘furnace’; *kol* ‘tiger’; rebus: *kolhe* ‘smelters of iron’.] **kol** metal (Ta.) **kol** = pan~calo_kam (five metals) (Ta.lex.) Thus, the entwined figures of 3 or more tigers may connote an alloy of 3 or more metals.

The person standing between the sign 15 and the bull facing a trough has his arm raised: *er-aka*, ‘raised arm’ = rebus: copper. The bull (**d.an:gra**) facing a (phonetic determinant) trough (**d.an:gra**) is rebus: blacksmith. Thus the inscription on m1405At can be read as: **d.an:gra er-aka kan.d kanka kut.i** = rebus: blacksmith copper gold furnace of the smelter. [*kan.d.* = a furnace, altar (Santali.lex.)]

h0734617 [An orthographic representation of a water-carrier]. m0838
2368 m02153081 m07412421 m0969 2239
Lothal042 m0188  1287 m0229  3075
m0328 m0429 Text  2862 Kalibangan020  8047

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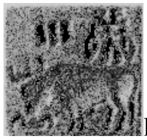
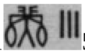
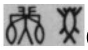
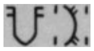
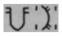
h0815063 m0995 Chanhudaro21a 6209 The second sign is a ligature: carrying pole with slings + rim of pot: *ka_ca* + *kan.d.kankha* (Substantive: iron spit + furnace)

kut.hi ‘a furnace for smelting iron ore to smelt iron’; *kolheko kut.hieda* koles smelt iron (Santali) **kut.hi, kut.i** (Or.; Sad. **kot.hi**) (1) the smelting furnace of the blacksmith; **kut.ire bica duljad.ko talkena**, they were feeding the furnace with ore; (2) the name of **e_kut.i** has been given to the fire which, in lac factories, warms the water bath for softening the lac so that it can be spread into sheets; to make a smelting furnace; **kut.hi-o** of a smelting furnace, to be made; the smelting furnace of the blacksmith is made of mud, cone-shaped, 2’ 6” dia. At the base and 1’ 6” at the top. The hole in the centre, into which the mixture of charcoal and iron ore is poured, is about 6” to 7” in dia. At the base it has two holes, a smaller one into which the nozzle of the bellow is inserted, as seen in fig. 1, and a larger one on the opposite side through which the molten iron flows out into a cavity (Mundari.lex.) kut.hi = a factory; lil kut.hi = an indigo factory (H.kot.hi)(Santali.lex.Bodding) kut.hi = an earthen furnace for smelting iron; make do., smelt iron; kolheko do kut.hi benaokate baliko dhukana, the Kolhes build an earthen furnace and smelt iron-ore, blowing the bellows; tehen:ko kut.hi yet kana, they are working (or building) the furnace to-day (H. kot.hi_)(Santali.lex.Bodding) **kut.t.hita** = hot, sweltering; molten (of tamba, cp. uttatta)(Pali.lex.) uttatta (ut + tapta) = heated, of metals: molten, refined; shining, splendid, pure (Pali.lex.) kut.t.akam, kut.t.ukam = cauldron (Ma.); kut.t.uva = big copper pot for heating water (Kod.)(DEDR 1668). gudga_ to blaze; gud.va flame (Man.d); gudva, gu_du_vwa, guduwa id. (Kuwi)(DEDR 1715). da_ntar-kut.ha = fireplace (Sv.); **ko_ti** wooden vessel for mixing yeast (Sh.); kot.ha_ house with mud roof and walls, granary (P.); **kut.hi_** factory (A.); kot.ha_ brick-built house (B.); kut.hi_ bank, granary (B.); **kot.ho** jar in which indigo is stored, warehouse (G.); **kot.hi_** lare earthen jar, factory (G.); kot.hi_ granary, factory (M.)(CDIAL 3546). kot.ho = a warehouse; a revenue office, in which dues are paid and collected; kot.hi_ a store-room; a factory (G.lex.) **kod.** = the place where artisans work (G.lex.)

kor.o Has. Syn. of ged.e, ger.e Nag. A domesticated duck, *anas domestica* (Mundari.lex.) ged.e = a duck (Santali.lex.) ka_ran.d.avamu = a sort of duck (Te.lex.) ka_ran.d.ava = a duck (G.lex.)

phut.a = the hood or expanded neck of a snake (Skt.)

Lothal056 7100 h0595120 **kut.i** = the eyebrows (Santali.lex.)

put.a = an eyelid (Ka.)

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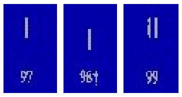
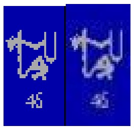
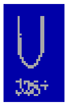
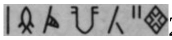
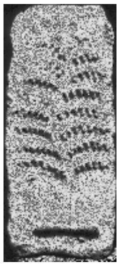
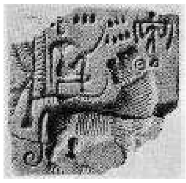
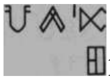
 **kut.i** = a slice, a bit, a small piece (Santali.lex.Bodding)

m0478Bt **erga** = act of clearing jungle (Kui) [Note image showing two men carrying uprooted trees].

  Signs 45/46 (seated person) seem to ligature the pictorial of a kneeling-adorant with sign 328 **erugu** = to bow, to salute or make obeisance (Te.) **er-agu** = obeisance (Ka.), ir_ai (Ta.)

m0309 Pict-109: Person with hair-bun seated on a tree branch; a tiger looks at the person with its head turned backwards. 2522
Glyph: *sal* a gregarious forest tree, *shorea robusta*; *kambra* a kind of tree (Santali)
Substantive: *sal* workshop (Santali)

  k049 m0310AC 1355

Molded terracotta tablet showing a tree with branches; the stem emanates from a platform (ingot?). Harappa. (After JM Kenoyer/Courtesy Dept. of Archaeology and Museums, Govt. of Pakistan).

kut.i, kut.am = tree; rebus: **kut.hi** = furnace

The glyph continues into historical periods. Sealing, device of a tree on a platform, Kaus'a_mbi_, Allahabad Museum, No. 259. [After Pl. XXXII, 3 in: Thaplyal, 1972]

A sinuous tree with short leaves. Terracotta tablet. Harappa H95-2523 (After Fig. 6.3 in JM Kenoyer, 1998]. Nausharo. Jar with three papal leaves. Period 1D, 2600 – 2550 BCE [After Samzun, 1992, Fig. 29.4, no.2; cf. Fig. 6.4 in JM Kenoyer, 1998]

Elephant trunk '**ibha sun.d.**'
Rebus: **ib** 'iron'; **sund** 'pit, furnace'

Seal. Elephant. Elephant is covered with a saddle cloth. (After Scala/Art Resource)

The depiction of a saddle cloth on the elephant may also be related to the orthographic significance of depicting a pannier on a one-horned bull. It may connote a waist-zone, belt, **kamarasa_la** (Te.); rebus: **kamma_rasa_le** = workshop of a blacksmith (Ka.) When an elephant is shown on epigraphs with such a saddle cloth, the depiction may be of a kamma_ra 'smith' involved in ironsmithy: **ib**

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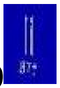
‘iron’; rebus: **ibha** ‘elephant’.

Alternative: **kac** 'waist-belt'; rebus: **kacc** 'iron']

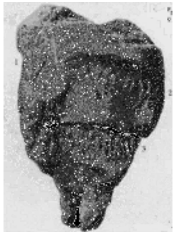
ib ‘iron’; **sund** ‘pit furnace’; sund = a subterranean passage, a mine, pit, large hole; koela la lateka sund akata = they made a deep pit by digging for coal (Santali) **kar.c ib** = very excellent iron (Ko.) ibhya = rich, wealthy (Skt.) **ib** ‘iron’ (Ko.); needle (To.); irumpu iron, instrument, weapon (Ta.); irumpu, irimpu iron (Ma.); irimbi iron (Kod.); inumu id. (Te.); inum (pl. inmul) iron, sword (Kol.); rumba vad.i ironstone (Kui)(DEDR 486).

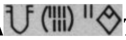
Two scorpions: **kacc** + **ib** = reduplicated terms for iron, very excellent iron [**kar.c ib** = excellent iron (Ko.)]

ib = two; as in: ibbaru = two persons (Ka.)

(42) **Sign 87 (365)**

Copper tablets (21)



Lothal165A7203

On 15 tags with seal impressions, the associated text is as shown on top line of Text 7236 and associated with ‘one-horned bull’ motif.

On 9 tags with seal impressions, the associated text is as shown on top line of Text 7251 and associated with ‘one-horned bull’ motif.

It has been noted in earlier attempts at decipherment that many seals with inscriptions have cord holes, suggesting that the seals might have been worn by their owners. If so, it is likely that the inscribed objects were lists of property possessions of the owners.

Apart the use of copper tablets and in a few cases, the use of silver and copper for seals which indicates that the messages are possibly engraved by metal- and/or fire-workers (cf. the use of fired-in faience for seals), the dramatic clue to the decipherment of the script comes from the characteristic shapes of a few objects.

There are also inscriptions on bronze implements, re-inforcing the deduction that the metal- and/or fire-workers were the major script-writers of the civilization. If the writers of the script were also the owners of or traders in the products made from metal- and fire-work, then the messages conveyed were likely to be related to their life-activities. This is a possibility because at this stage of the evolution of chalcolithic cultures, ca. 3000 BCE, the differentiation in the labour-force might not have reached a stage when a separate group of or the profession of 'script-writers' had been recognized.

Taking a cue from the differentiation of functions among the artisans in Mesopotamian civilization, it is hypothesized that the inscribed objects of the civilization will present such a differentiation among the artisans of the Sarasvati Sindhu valleys. Smiths (Sum. simug, Akk. nappa_hum), responsible for (s)melting and casting, were distinguished from metalworkers (Sum. tibira, Akk.

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gurgurrum) who worked with metal and created objects. These, on the other hand, were distinctly different from jewellers (Sum. zadim) and goldsmiths (Sum. ku-dim/dim, Akk. kutimmum)... Given the large number of metal tools, weapons and vessels recovered from sites in southern Mesopotamia, there is, as with ceramics, a frustrating lack of excavated workshop facilities. (D.T.Potts, *Mesopotamian Civilization: The Material Foundations*, 1997, Ithaca, Cornell University Press).

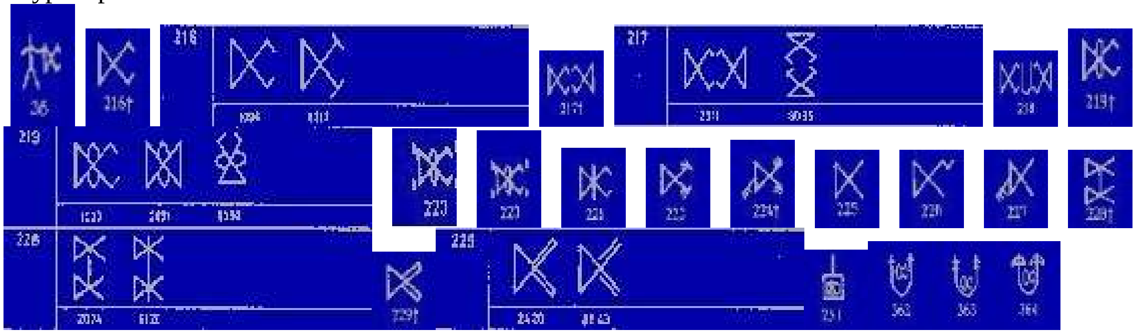
Substantive: **kol** ‘metal’, ‘pancaloha or alloy of five metals’ (Ta.)

ko_li = a stubble of jo_l.a (Ka.) ko_le a stub or stumpof corn (Te.)(DEDR 2242).

The ligature is made up of two glyphs: **( )** together with **tagara** = taberna montana (Skt.) Rebus: **t.agromi** = tin metal alloy (Kuwi) **kut.ila** = bent, crooked (Skt.)

Glyph: ‘Humpbacked’ **kud.illa** (Pkt.)

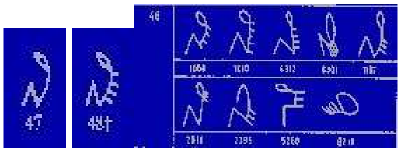
Glyph: ‘pincers’



Signs 36, 216-229,251,362-364 + variants, ligatures **kut.ilikaka_** smith’s tongs (Skt.)(DEDR 2052). Tongs (1) kot.il (Ma.), **kot.iru** (Ta.); kor. Hook of tongs (Ko.)

Rebus: **kut.ila, katthi_l** = bronze (8 parts copper and 2 parts tin) [cf. a_ra-ku_t.a, ‘brass’ (Skt.)] kut.ila (Skt. Rasaratna samuccaya, 5.205)

Kalibangan100

 Seated skeletal person (Sign 48) It will be seen from the sign variants that the artist is focusing on three characteristics: the person is seated, the backbone is emphasized, the person wears a hair-do. The kneeling posture is clearly comparable to Sign 45 which shows a kneeling adorant, but Sign 48 is evolved without the ligature of a rimless pot Sign 45

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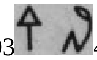
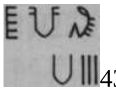
Evolution of Sign 48 can be explained from the orthography of a seal from Kalibangan (048) which clearly demonstrates that the artist is trying to emphasise the semantics of a backbone of a kneeling person, perhaps also making an offering.

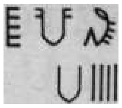
Kalibangan048 “The seated person is facing right (in the original seal), leaning forward. He has a large head and a massive jaw jutting forward. The complete ribcage is shown in clear detail with almost all the ribs in position, curving naturalistically on either side of the backbone. The deity appears to be holding a ladle (?) in his right hand. His knees are drawn up and he seems to be squatting on his haunches. The details are clearly visible in the highly enlarged photograph of the seal published in Pl. 275: Omananda Saraswati 1975. *Ancient Seals of Haryana* (in Hindi). Rohtak.” (I. Mahadevan, 'Murukan' in the Indus Script, *The Journal of the Institute of Asian Studies*, March 1999).

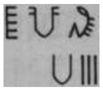
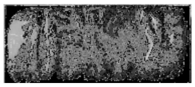
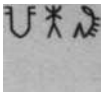
A three sign sequence including this ‘seated skeletal person’ is the most frequently occurring three-sign sequence among the inscribed objects. The occurrence is mostly on miniature tablets of Harappa

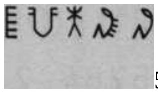
h5034129 m0330A 0330B Perforated through the narrow edge of a two-sided seal 1475 Many incised miniature tablets of Harappa contain this sign within a sequence as shown on one side: h959Ait (incised tablet). Many duplicate texts contain this sign sequence.

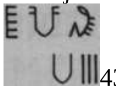
[glyphs: backbone, rim of pot, comb]

h233A h233B 4387

h312Ac h312B  5426 h934Ait h934Bit

h959Ait h959Bit  4405 h179A h179B 

307 h741Bt 5263 h742At [The last two signs of Text 5263 occur on 184 epigraphs]

[At least 46 inscribed objects with epigraphs contain the sequence of three signs – line 1 (Statistics from Mahadevan corpus) 4387]

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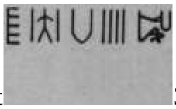
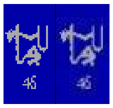
[Dh. Des. **karod.iya_** from Skt. *karot.ika_* the skull; cf. Hem. Des. *kod.iyam* fr. Skt. *kos.t.ha* the inner part] *kod.iyum* an earthen cup holding oil and a wick for a light (G.) Seller of earthenware, earthen goblets, smoking pipes etc. = **kara_d.iyo**, **kara_l.iyo** (G.) *kot.ho* an earthen vessel in which indigo is stored (G.) *khora* a kind of large brass bowl; the vessel which receives the juice of sugar-cane when being pressed (Santali)

karadamu = present to a superior (Te.lex.) **karet.um** = an annual offering and present to a godess or to an evil spirit (G.lex.) karavr.tti (Skt.)

m0478At m0478Bt

m0479At m0479Bt 3224 Repetitive also occurs as texts: 2815, 3230.The text is repeated on three double-sided moulded tablets in bas-relief. The first sign of the text is a glyph depicting a kneeling person, in front of a leafless tree, making an offering, holding a rimless pot in his hands.

m0480At m0480Bt Tablet in bas-relief. Side a: Tree Side b: Pict-111: From R.: A woman with outstretched arms flanked by two men holding uprooted trees in their hands; a person seated on a tree with a tiger below with its head turned backwards; a tall jar with a lid. Is the pictorial of a tall jar the Sign 342 with a lid?

Sign 45 seems to be a kneeling adorant offering a pot (Sign 328)  Signs 45/46 seem to ligature the pictorial of a kneeling-adorant with sign 328

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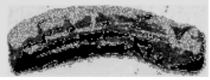
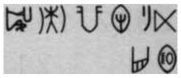
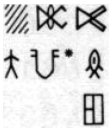
Depicting a kneeling adorant in glyphs and signs

On a twisted, moulded tablet (m0481), there are pictorial motifs on four sides. On side A, there is an epigraph containing six-signs; the last sign of this epigraph (text 2846) includes Sign 45 – kneeling person holding a rimless pot.

m0481At m0481Bt

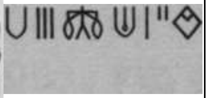
m0481Ct m0481Et 2846 Pict-41: Serpent, partly reclining on a low platform under a tree.

Person kneeling under a tree facing a tiger. [*Chanhudaro Excavations*, Pl. LI, 18] 6118



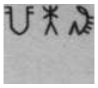
m1186Acolour 2430 Composition: horned person with a pigtail standing between the branches of a pipal tree; a low pedestal with offerings (? or human head?); a horned person kneeling in adoration; a ram with short tail and curling horns; a row of seven robed figures, with twigs on their pigtails.

Text 4316



h177Ah177BPict-115: From R.—a person standing under an ornamental arch; a kneeling adorant; a ram with long curving horns.

h178Ah178B 4318 Pict-84: Person wearing a diadem or tall head-dress (with twig?) standing within an arch or two pillars?



h179Ah179B 4307 Pict-83: Person wearing a diadem or tall head-dress standing within an ornamented arch; there are two stars on either side, at the bottom of the arch.

Glyphs of two kneeling adorants are shown on side B of a tablet (m0453), flanking a person seated on a low platform; two serpents rear up on either side, close to the two kneeling adorant glyphs.

med. iron (Ho.); *me~rhe~t* 'iron' (Santali)

man.t.i kneeling on one knee as an archer (Ta.); *man.tuka* to be seated on the heels (Ma.); *man.d.i* what is bent, the knee (Ka.); knee (Tu.); kneeling on one knee (Te.); *men.d.a_*, *mind.a* knee (Go.); **med.a, men.d.a** id. (Kond.a); *mend.a* id. (Pe.KuiKuwi); *mand.u_ki* part of elephant's hind leg; *met.* knee-joint (M.)(DEDR 4677). **man.d.i** = kneeling position (Te.lex.) mandil, mandir = temple (Santali)

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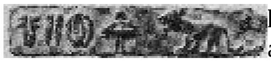
karad.a_pa_t.i_ = a wooden board in the form of a slate, on which little boys learn elementary figures and the letter of the alphabet (G.lex.) **karud.u** = a rough day book, account (Te.lex.); kharad.o = a rough copy, a register of fields in a village; a subscription list (G.lex.)

kara.d.amu = a wave (Te.lex.) kharad.akum = a streamlet (G.lex.); ks.ar = to drop (Skt.)

karot.i = human skull (G.Skt.)

ka_rad.o = a field; a plot of ground; a bed of rice (G.); keda_ra (Skt.)(G.lex.) kara_d.o = a high and steep bank; kara_d. = a precipice (G.lex.)

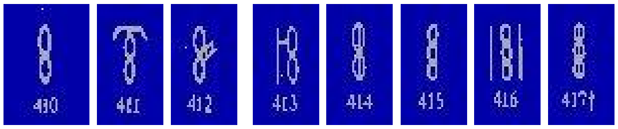

karat.i, karat.ikai a kind of drum (said to sound like a bear)(Ta.); karad.i, **karad.e** an oblong drum beaten on both sides, a sort of double drum (Ka.); karat.a a kind of drum (Skt.)(DEDR 1264).

karat.i, karut.i, kerut.i fencing, school or gymnasium where wrestling and fencing are taught (Ta.); garad.i, garud.i fencing school (Ka.); garad.i, garod.i (Tu.); garid.i, garid.i_ id., fencing (Te.)(DEDR 1262).

karat.i, 'elephant' (Te.)

khara_di_ = turner (G.)
karad.o, kara_d.i_ a goldsmith's tool (G.lex.)
karan.d.amu = a bee-hive (Te.)
karad.a = crown
khared.o = a currycomb (G.lex.)
karad.a = a sting (G.lex.)
karad.o = a toe ring (G.lex.)

kad.iyo [Hem. Des. **kad.a i o** = Skt. sthapati a mason] a bricklayer; a mason; kad.iyan.a, kad.iyen.a a woman of the bricklayer caste; a wife of a bricklayer (G.)



kad.i_ a chain; a hook; a link (G.); **kad.um** a bracelet, a ring (G.)

khad.a_i_ a heifer (used in the Sorat.h Pra_nt)(G.)

A remarkably stable pair of glyphs are the rim of a jar and a glyph depicting a spine, backbone of an emaciated person, Sign 48.

Eight inscribed copper tablets were found at Harappa and all were made with raised script, a technique quite different from the one used at Mohenjo-daro for flat copper tablets with many duplicates. Harappa. Raised script. H94-2198. [After Fig. 4.14 in JM Kenoyer, 1998]. The duplicates occur on steatite and faience tablets at Harappa; these may have represented **a commodity or a value.** [cf. JM Kenoyer, 1998, p. 74].

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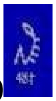
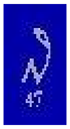
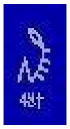
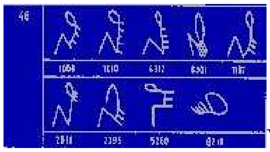
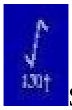
(114) **Sign 48 (168)** Copper tablets (13)

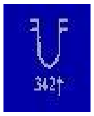
Alternative:

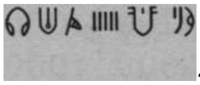
ri_ti = yellow brass, bell metal (Skt.); ritika = calx of brass; ritika_ = brass (Skt.); ri_ri_, riri_ = yellow brass (Skt.); rit = copper (Dm.); ri_t (Gaw.); ri_da (Sv.); ri_a = brass (Bshk.); ri_ri_ = brass (Pkt.); **ri_l** = brass, bronze, copper (Sh.)(CDIAL 10752).

V048, Signs 47, 48 **ri_r.** = backbone (WPah.) ri_rh = backbone (Aw.); ri_r.h (H.); ri_d.haka = backbone (Skt.)(CDIAL 10749a).

d.han:ga = a crook used for pulling down the branches of trees, for goats, sheep and camels (P.lex.) Sign 130

The glyph 'skeleton' may also be explained as rebus: da_kali, da_gali = an anvil (Te.lex.) **d.ha~go** = skeleton; lean (Ku.); d.a_n:ga = one who is reduced to a skeleton (Or.); d.a~_gar, d.a~_gra_ = starveling (H.); d.ha~_kal., d.ha_~ku_l. = old and decaying (M.); d.ege = old, weak (Wg.)(CDIAL 5524).

 (93) **Sign 8 (105)**
A variant of Sign 8 is a horned, standing person ligatured to the buttocks of a bull. **d.hagara_m** = pl. the buttocks, hip (G.) Rebus: **d.han:gar** = blacksmith

m1224A m1224B m1224 m1224e 4319
Standing person with horns and bovine features (hoofed legs and/or tail). **d.hagara_m** 'thigh' (G.); rebus: **d.han:gar** 'blacksmith' (H.)

Rebus: **d.a_n:ro** = a term of contempt for a blacksmith (N.)(CDIAL 5524) t.ha_kur = blacksmith (Mth.); t.ha_kar = landholder (P.); t.hakkura – Rajput, chief man of a village (Pkt.); t.hakuri = a clan of Chetris (N.); t.ha_kura – term of address to a Brahman, god, idol (Or.)(CDIAL 5488). **dha~_gar., dha_~gar** = a non-Aryan tribe in the Vindhyas, digger of wells and tanks (H.); dha_n:gar = young servant, herdsman, name of a Santal tribe (Or.); dhan:gar = herdsman (H.)(CDIAL 5524). 4064.

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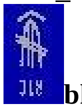
Blacksmith: t.ha_kur blacksmith (Mth.)(CDIAL 5488). d.a_n.ro term of contempt for a blacksmith (N.); d.a_n.re large and lazy (N.); d.an.ura living alone without wife or children (A.); d.a~_gar, d.a~_gra_ starving (H.); d.an.or unwell (Ash.); dan:gor lazy (Bashg.); d.angur (dat. d.anguras) fool (K.); d.a~_go lean (of oxen)(Ku.); d.a~_go male (of animals); d.a_n. wicked (A.); d.a_n:ga one who is reduced to a skeleton (Or.); d.i~glo lean, emaciated (Ku.); d.i~go, d.in.o abusive word for a cow (N.); d.in:gar contemptuous term for an inhabitant of the Tarai (N.); d.in:gara rogue (Or.); d.hagga_ small weak ox (L.); d.han:garu, d.hin:garu lean emaciated beast (S.)(CDIAL 5524). A tribe: d.ha~_gar., dha~_gar a non-Aryan tribe in the Vindhyas, digger of wells and tanks (H.); dhan:gar herdsman (H.); d.ha_n:gar. herdsman, name of a Santal tribe, young servant (Or.); dha_n:gar.a_ unmarried youth (Or.); dha~_gad. rude, loutish (M.); f. hoyden (M.)(CDIAL 5524). t.an:kan.a, t.an:gan.a name of a people living northwest of Madhyades'a (R.); t.am.kan.a a non-Aryan tribe (Pkt.)(CDIAL 5454). [cf. association of blacksmith and goldsmithy terms: t.an:ka-ca_lai < t.an:ka-s'a_la_ mint; t.an:kan.am borax (Ta.lex.) t.an:ka stone-cutter's chisel (Ta.lex.); spade, hoe, chisel (R.); stone-mason's chisel(CDIAL 5427). t.an:kam mace (Ma.)(DEDR 2940)].

Sign 48: **barad.o** = spine; backbone; the back; barad.o tha_bad.avo = lit. to strike on the backbone or back; hence, to encourage; barad.o bha_re thato = lit. to have a painful backbone, i.e. to do something which will call for a severe beating (G.lex.) barad., barad.u = barren, childless; baran.t.u = leanness (Tu.lex.) *man.uk.o* a single vertebra of the back (G.)

barad.u, bar-ad.u = an empty pot (Ka.lex.) **bhala_n.d.e~** = the half-pot or the shard which, with fire in it, the gosa_yi_ or the gondhal.i_-people hold on their hand; gondhal.i_ are musicians and singers; gondhal. = a tumultuous festivity in propitiation of devi_ (M.lex.) **bha_liyo** = a waterpot (G.lex.) **baran.i, baran.e** = the trough of a water-lift; a china jar (Tu.lex.) **bhara.ni_** = a cooking pot (G.)

bharad.o a devotee of S'iva; a man of the *bharad.a_* caste in the bra_hman.as (G.) **barar.** = name of a caste of **jat-** around Bhat.in.d.a; barar.an da_ mela_ = a special fair held in spring (P.lex.) **bhara_d.** = a religious service or entertainment performed by a bhara_d.i_; consisting of singing the praises of some idol or god with playing on the d.aur (drum) and dancing; an order of at.hara_ akha_d.e = 18 gosa_yi_ group; bhara_d. and bha_rati_ are two of the 18 orders of gosa_yi_ (M.lex.)



bharad.o = cross-beam in the roof of a house (G.lex.) bha_rat.iyum, bha_rvat.iyo, bha_rot.iyo = a beam (G.lex.) ba_ri = bamboo splits fastened lengthwise to the rafters of a roof from both sides (Tu.lex.) ba_rapat.t.e = chief beam lying on pillars (Te.lex.) **bharan.um** a piece in architecture; placed at the top of a pillar to support a beam (G.)

Rebus: **bharatiyo** = a caster of metals; a brazier; bharatar, bharatal, bharatal. = moulded; an article made in a mould; bharata = casting metals in moulds; bharavum = to fill in; to put in; to pour into (G.lex.) **bhart** = a mixed metal of copper and lead; bhart-i_ya_ = a barzier, worker in metal; bhat., bhra_s.t.ra = oven, furnace (Skt.)

marud.iyo = one who makes and sells wristlets, and puts wristlets on the wrists of women (G.lex.) **marad.a** = twisting; a twist; a turn; marad.avum = to twist, to turn; marad.a_vum = to bend; marod.a = a twist, a turn; writhing, a bend; marod.avum = to writhe, to twist, to contort; to bend (G.lex.)

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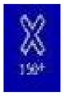
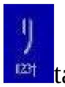
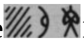
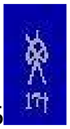
Glyph: **t.hat.ra** = m. emaciated (Santali) **t.ha_t.hum** = a frame-work, the body; t.ha_t.ha = state, dignity, pomp (G.) Hem. Des. t.ha_n.a = Skt. ma_nah pride, fr. Skt. stha_nam manner of standing, fr. stha_ 'to stand' (G.) **t.a_t.um** = a bamboo-frame which serves as a seat (G.) t.hat.ra = a kind of bamboo mat (Santali)

 Sign 150 glyph: **tat.am** = road, path, route, gate, footstep (Ta.); **dad.d.a** road (Ir.); dar.v path, way (Ko)(DEDR 3024).

tat.t.ai = mechanism made of split bamboo for scaring away parrots from grain fields (Ta.); **tat.t.e** = a thick bamboo or an areca-palm stem, split in two (Ka.)(DEDR 3042).

Rebus: **t.hat.era** = a brazier, a caste who manufacture and sell brass ware; t.hat.ori = a worker in brass, a goldsmith (Santali) **tot.xin, tot.xn** goldsmith (To.); tat.t.a_n- gold or silver smith (Ta.); goldsmith (Ma.); **tat.t.e** = goldsmith (Kod.); tat.rava_~d.u = goldsmith or silversmith (Te.); *t.hat.t.haka_ra brassworker (Skt.)(CDIAL 5493).

Sign 12is a glyph showing the framework of a body.

m1653 ivory plaque1905

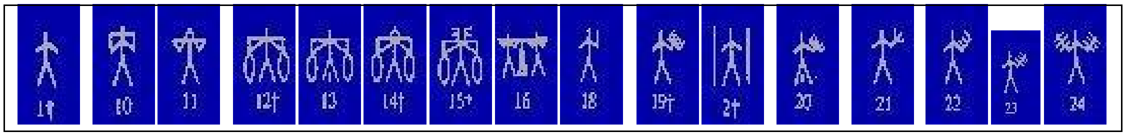
ten:go ten:gon = to assume responsibility to appoint (Santali) [The rebus representation of 'standing person' pictograph can thus be interpreted as a functionary related to the ligatured pictograph (and related substantive rebus)].

ten:go, ten:gon = to stand, to stand still, to assume an upright or perpendicular position, to raise to an upright position (Santali) ten:gen = to kill for sacrifice by cutting off the head with a knife (Santali) [Note the orthography of Sign 1 and many variants is that of a headless body.]

Rebus: tega = a sword; tega_ = a scimitar (G.Persian) **tega_r** = property, substance (G.Persian)

t.ha_n:kum = a skeleton (G.)

t.a_n:kan.um = a chisel (G.); t.an:ka_ = an instrument for digging, khanitram (Hem.Des. G.)



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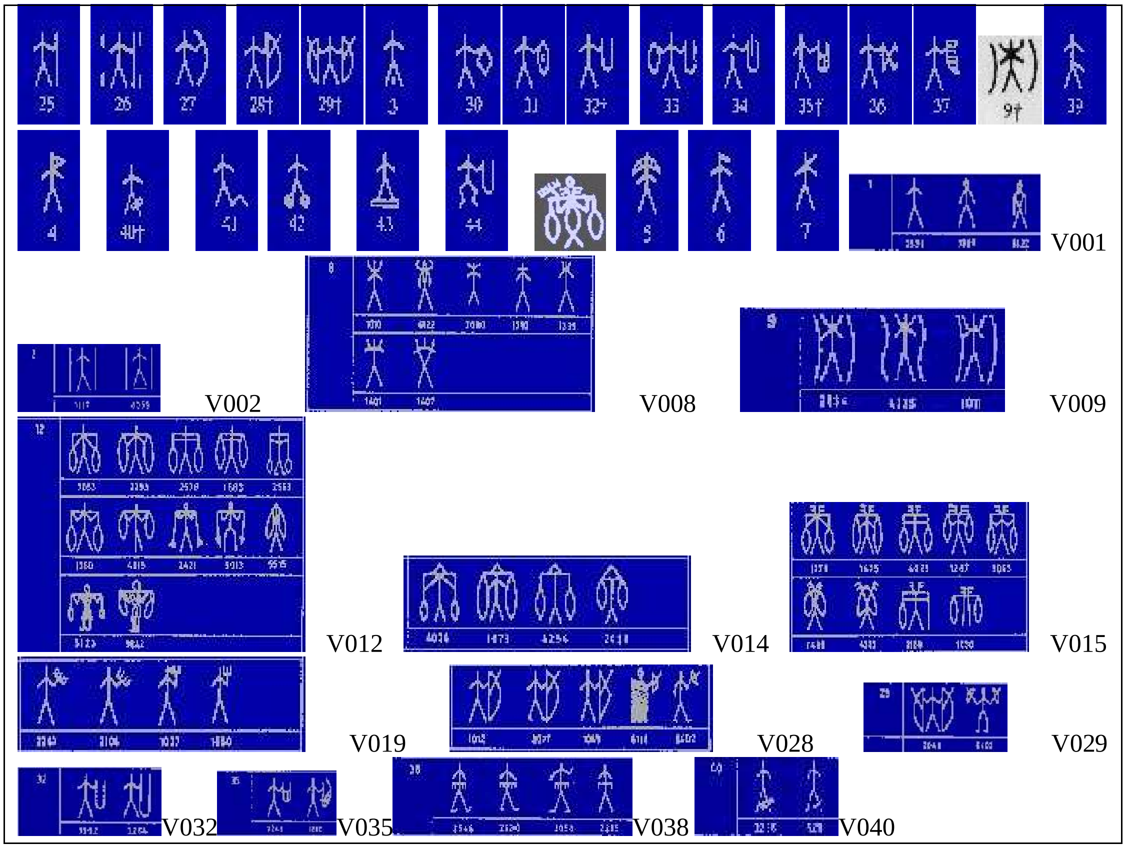

Sign 8 A variant of Sign 8 is a horned, standing person ligatured to the buttocks of a bull. **d.hagara_m** = pl. the buttocks, hip (G.) Rebus: **d.han:gar** = blacksmith.

Sign 12 **kut.i** 'water carrier'; rebus: **kut.hi** 'furnace'

Seal impression, Ur (Upenn; U.16747); dia. 2.6, ht. 0.9 cm.; Gadd, PBA 18 (1932), pp. 11-12, pl. II, no. 12; Porada 1971: pl.9, fig.5; Parpola, 1994, p. 183; water carrier with a skin (or pot?) hung on each end of the yoke across his shoulders and another one below the crook of his left arm; the vessel on the right end of his yoke is over a receptacle for the water; a star on either side of the head (denoting supernatural?). The whole object is enclosed by 'parenthesis' marks. The parenthesis is perhaps a way of splitting of the ellipse (Hunter, G.R., JRAS, 1932, 476). An unmistakable example of an 'heiroglyphic' seal.

Graphemes, i.e. glyphs which could be rebus for **kol** 'metal' (Ta.):

kol.i_ = water carrier (M.)

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ko_l. = planet (Ta.)

xola_ = tail (Kur.); qoli = id. (Malt.)(DEDR 2135).

Sign 67 **kolli** = a fish (Ma.); koleji id. (Tu.)(DEDR 2139). ko_la_ flying fish, exocaetus, garfish, belone (Ta.) ko_la_n, **ko_li** needle-fish (Ma.)(DEDR 2241).

a~s = scale of fish (Santali)

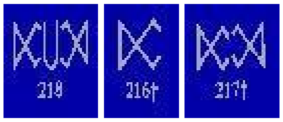
Rebus: **ayas** = metal (Skt.)

ko_l.i = banyan, fig (Ta.Ma.); **go_l.i** fig (Ka.); banyan (Tu.)(DEDR 2254).

ko_l raft, float (Ta.Ka.); kola boat, raft (Skt.BHSkt.); kulla (Palli)(DEDR 2238)

ko_la decoration (Ka.); ko_lam = form (Ta.Ma.)(DEDR 2240).

Rahman-dheri01A and B Rhd1: Two scorpions flanking a 'frog?' [?**kamat.ha**] and a sign **T** with two holes on the top, possibly to be tied on a string [Together with *bica_*, sand ore, the sign, 'T' may connote another ore, perhaps tin].



kamat.ha = a crab, a tortoise (G.lex.) kamat.ha = tortoise (Skt.) kamad.ha, kamat.ha, kamad.haka, kamad.haga, kamad.haya tortoise (Pkt.lex.) **kamat.hamu** = a tortoise; kamat.hi = a female tortoise (Te.lex.)

Glyph: **kaca kupi** = scorpion (Kuwi)
Rebus**:** kanca_ **=** a marble (made of stone or lac)(Ka.) Stone beads! ka_ca_ **=** glass (Santali) **kan~cu** **=** bronze (Te.)

kas kasa bronze; *ka_s*, *kasa* bell-metal; *kasa pitar* bell-metal and brass (Santali) *kan~cu* bronze (Te.) *ka~c* glass (Santali) *ka_cu* gold, gold coin, money, a small copper coin (Ta.); *ka_s'u* gold, money, the smallest copper coin (Ma.); *ka.c* rupee (Ko.); *ko.c* id. (To.); ka_su the smallest copper coin, a cash, coin or money in general (Ka.); an old copper coin worth half a pie, a cash (Tu.); a cash, a coin in general, a gold coin, money (Te.); pice <Te. (Go.); *kars.a* (Skt.)(DEDR 1431). **kaca** = a piece, one quarter of an anna (Santali) **kase_ra_** metal worker (L.)[viii]

kac, kas, kacci iron (Go.); *kacc* iron, iron blade (of spade)(Go.); *kacci* iron sword (Go.); sword (Kol.) ? < IA (DEDR 1096; CDIAL 2866) [ix]

kars.a = gold coin (Vedic) **kasa** = quality of gold or silver (as determined by rubbing it on a touch-stone); kas. To rub, to test (Skt.); kas = pith (Arabic); kas = remunerativeness (of a trade)(G.) kasan. = rubbing, testing; kasan.uvum = to mix by gradually rubbing the ingredients together, to mix by rubbing (G.) kasot.i_ (kasa 'rubbing' + vr.tti 'a circle') a touchstone,

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generally round in form; making a trial, ann experiment (G.) kasabi_ = an artist, an artisan; adj. skilful, clever (G.) kasab (Arabic) a business, a trade, a profession; conversancy in an art, proficiency; an artifice, a device (G.) kasa_ya, kasa_ba a butcher (Ka.); kasa_i_ (M.)(Ka.lex.) kaca_ppu slaughter of animals for food; butcher (Ta.); kassa_b (U.)(Ta.lex.)

kasi_do (Persian kas'i_dan to draw) embroidery; a piece of brick or tile burnt in fire and turned hard (G.) kaja (kaji-) to be congealed, solidified by growing cold; ganja (ganji-) to solidify, coagulate, become solid (Kui); kajali = to be congealed, become curdled (Kuwi)(DEDR 1102). kas- = to be lit (as fire), burn (Kond.a); hiccu kahinomi = we kindle fire (Kuwi)(DEDR 1090).

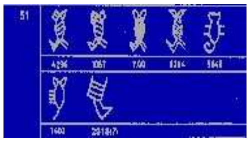
kaca kupi = scorpion (Mand.); kasa (kasi-) to bite, sting (Kui); kaccinai = to bite, sting (Kuwi)(DEDR 1097). kharju_raka scorpion (Skt.); khajuro centipede (N.); khajria_ (Or.); khaju_ra_ (H.); khajura_ twisted (of thread)(H.)(CDIAL 3829).

Bandicoot ko_d.el (Pa.) [**kod.el** = rat (Go.)]

Deer kod.al (Go.) [god.lu, go_dalu = horned cattle (Te.); gud.va = nilgai (Pa.)]

c023

god.el axe (Go.) kod.ari (Tu.)



Variants of Sign 51. Seal impression; UPenn; steatite; bull below a scorpion; dia. 2.4cm.; Gadd, PBA 18 (1932), p. 13, Pl. III, no. 15; Legrain, MJ (1929), p. 306, pl. XLI, no. 119; found at Ur in the cemetery area, in a ruined grave .9 metres from the surface, together with a pair of gold ear-rings of the double-crescent type and long beads of steatite and carnelian, two of gilt copper, and others of lapis-lazuli, carnelian, and banded sard. The first sign to the left has the form of a flower or perhaps an animal's skin with curly tail; there is a round spot upon the bull's back.

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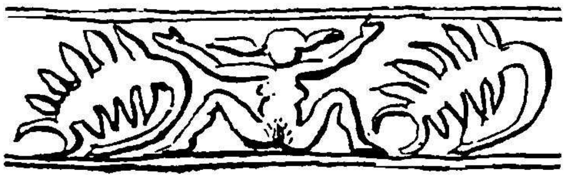
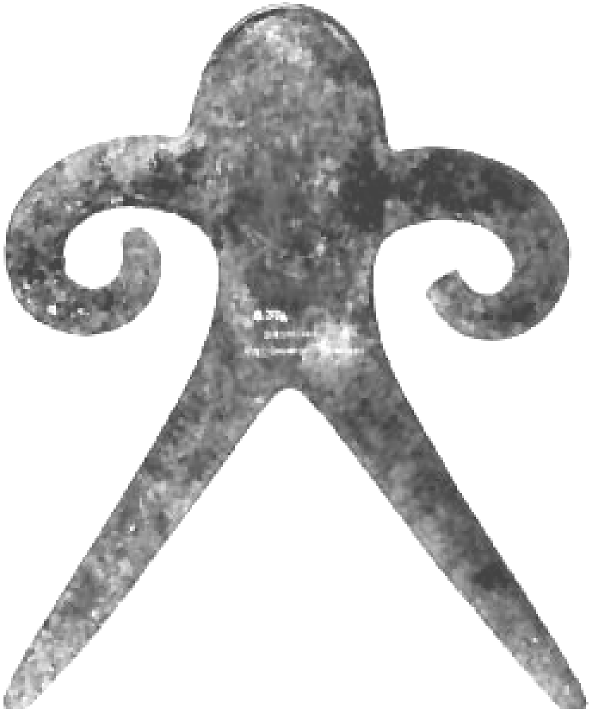
A symbolism of a woman spreading her legs apart, which recurs on an SSVC inscribed object. Cylinder-seal impression from Ur showing a squatting female. L. Legrain, 1936, *Ur excavations, Vol. 3, Archaic Seal Impressions*. [cf. Nausharo seal with two scorpions flanking a similar glyph with legs apart – also looks like a frog].



Mohenjo-daro. Sealing. Surrounded by fishes, lizard and snakes, a horned person sits in 'yoga' on a throne with hoofed legs. One side of a triangular terracotta amulet (Md 013); surface find at Mohenjo-daro in 1936. Dept. of Eastern Art, Ashmolean Museum, Oxford.

The hearth is a major possession of a metalsmith.

Anthropomorph with 'fish' sign incised on the chest and with curved arms like the horns of a ram. Sheorajpur (Kanpur Dist., UP, India). State Museum, Lucknow (O.37) Typical find of Gangetic Copper Hoards. 47.7 X 39 X 2.1 cm. C. 4 kg. Early 2nd millennium BCE.



kor-r-a = black murrel (Te.), kur_icci = a fish many sharp bones (Ma.)
kur-avai = murrel (Ta.)

kor-r-a = ram (Ma.) [**kura** = bull calf (Go.)]

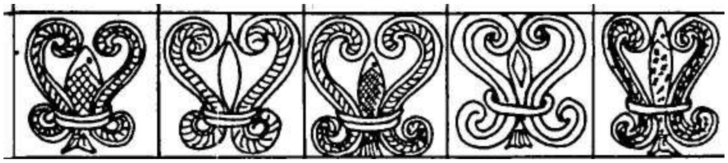
Substantive: **koru** a bar of metal (Tu.)

bed.a = either of the sides of a hearth (G.)

be = two (G.)

Sign 59 Glyph: **bed.a hako** = fish (Santali) **be_d.isa** = a sort of carp, the silver-fish, cyprinus chrysoparius (Te.) Grapheme: **be_d.i** = a chain, a fetter (Ka.Te.)

Two fishes can thus be used to connote a hearth with two sides. Such a glyptic representation emerges as the s'rivatsa glyph as demonstrated below; two fishe are intertwined, fettered.



Sa_n~ci stu_pa with a glyph of two fishes ligatured. S'ri_vatsa symbol seems to have evolved

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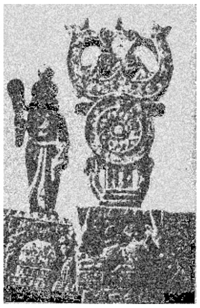
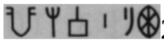


from a stylized glyph showing ‘two fishes’. In the sa_n~ci stu_pa, the fish-tails of two fishes are combined to flank the ‘sri_vatsa’ glyph. In a Jaina a_ya_gapat.a, a fish is ligatured within the s’ri_vatsa glyph, emphasizing the association of the ‘fish’ glyph with s’ri_vatsa glyph.

This Gujarati lexeme, **bed.a**, ‘either side of a hearth’, explains why the fish glyph is a dominant glyptic presence in many epigraphs of the civilization and in later-day devices used on punched marked coins.

Glyph ligatures

http://kalyanaraman.net/signs/Cylind~5.jpgThere are many pictorial ligatures exemplied by such compositions of animals, further exemplified by the composition referred to as the 'fabulous animal'.

m0300 2521

m0300 (Body of a ram, horns of a bull, trunk of an elephant, hindlegs of a tiger and an upraised serpent-like tail). Ligatures are basic signs and/or pictorials in inscriptions super-imposed on one another to compose a composite representation of components.

mlecchamukha = copper (Skt.); what has the copper-coloured complexion of the Greek or Mahomedans]. mer-iya = a rock; mer-ayu = to shine, glitter (Te.lex.) **mer** = a kind of large copper or brass pot (G.lex.) cf. **melukka** = copper (Pali); mleccha = copper (Skt.)

mr..eka = goat (Te.); mlekh (Br.) **mer.h, mer.ha_,** me~d.ha_ ram (H.), med.hia_o (Dh.Des.) ram, goat, sheep (G) mid.iyo = having horns bent over forehead (G.)(CDIAL 10120). **me~r.a_, me~d.a_** = ram with curling horns (H.)(CDIAL 10120). me_t.am = goat (Ta.lex.)

mu~h = ingot (Santali) mu~h = face (H.)

mu~h metal ingot (Santali) **mu~ha~** = the quantity of iron produced at one time in a native smelting furnace of the Kolhes; iron produced by the Kolhes and formed like a four-cornered piece a little pointed at each end; **mu_ha_ me~r.he~t** = iron smelted by the Kolhes and formed into an equilateral lump a little pointed at each end; **kolhe tehen me~r.he~tko mu_ha_ akata** = the Kolhes have to-day produced pig iron (Santali.lex.)

Ligaturing is a procedure for attaching two signs or field symbols or parts of field symbols (e.g. combining heads of unicorn, short-horned bull, antelope, or leaf images) into one composite motif.

Concept of ligaturing and parallels in Mesopotamian civilization: provide clues to an understanding of logography used in inscribed objects of Sarasvati Sindhu Civilization.

Form

Ockham’s razor! Use a rebus glyph and ligature it to generate a writing system. The result is a stunningly compact and precise writing system.

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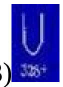
The form of the writing system is governed by a remarkably economical use of glyphs (both pictorial motifs and signs); an average of 5 signs are used in a message with or without pictorial motifs. This economy of use is ompensated by a system of ligaturing glyphs (both pictorial motifs and signs, exemplified by ligatures of multiple animal motifs and ligatures of, say, rimless pot with a five-petalled plant such as *taberna montana*).

Thus the form is essentially glyptic, not unlike the Egyptian heiroglyphs, with the variation that unlike Egyptian heiroglyphs which are presented in 'sequence', many glyphs of the civilization *occur in ligatured forms.

Sign 328 (323) The glyph is a rimless pot.

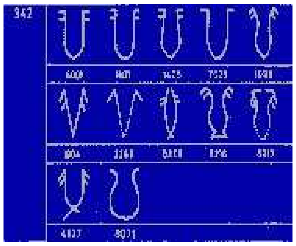
mer.go = rimless vessels (Santali)

Rebus: **med.** iron, iron implements (Ho.) *me~rhe~t* 'iron'; *me~rhe~t icena* 'the iron is rusty'; *ispat me~rhe~t* 'steel', *dul me~rhe~t* 'cast iron'; *me~rhe~t khan.d.a* 'iron implements' (Santali) (Santali.lex.Bodding)

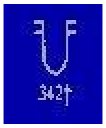
Alternative: **luiha** = an iron vessel or pot used for cooking and other purposes (Santali) Rebus: **luhui** = iron-stone sand; iron obtained by washing the sand of river beds and nallahs (Santali)

The most frequently occurring sign is Sign 342 with over 1395 occurrences

Daimabad The glyph is the rim of a short-necked jar can be explained in the context of a metalsmith's repertoire.



Sign342 (1395) kan.d.a kanka = rim of pot (Santali) **kanka** = rim of pot (Santali) [cf. cognate, **karn.aka** Skt.]

kankha, **kan.d.a** (Santali); **ka~kh;**  **kankha** = brim, rim of a vessel **kanna_** (H.)(Santali.lex.Bodding) **kan.t.u** = the rim of a vessel (Ka.lex.) **kan.d.a** = an earthenware pot (having a neck a little longer than that of a t.hili, but otherwise of about the same shape as this, only somewhat larger; ghar.a kan.d.a = a waterpot of brass (Santali.lex.Bodding)

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khan.d.i_ = ivory in rough (Jat.ki_) [See dotted circles.]

Terracotta female adorned with 'dotted circles'; Period Namazga II; Yalangach Tepe, Geoksyur (Weiner, 1984, Fig. 183)
khan.d.i = a sar.i, a full dress for a woman, a piece of cloth twelve cubits long by two in width; khan.d.a = a piece of cloth suitable for the dress of a woman's sar.i; khan.d.i bande, bande = to dress, of women binding round waist (Santali)

Dotted circles and vedi (yajn~a kun.d.am)

A dotted circle connotes a fire altar.

Slide 203 (Kenoyer, 2002). Steatite button seal Fired steatite button seal with four concentric circle designs from the Trench 54 area (H2000-4432/2174-3).

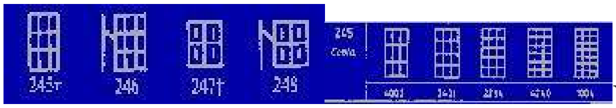
kandhi = a lump, a piece (Santali.lex.) [The dotted circle thus connotes an ingot taken out of a **kan.d.i**, furnace]. **ka_ndavika** = a baker; kandu = an iron plate or pan for baking cakes etc. (Ka.lex.)

kan.d. = altar, furnace (Santali) This yajn~a kun.d.am can be denoted rebus, by perforated beads (**kandi**) or on ivory (**khan.d.):**

kandi (pl. -l) beads, necklace (Pa.); kanti (pl. -l) bead, (pl.) necklace; kandit. bead (Ga.)(DEDR 1215). The three stringed beads depicted on the pictograph may perhaps be treated as a phonetic determinant of the substantive, the rimmed jar, the khan.d.a kanka: khan.d.a, xanro, sword or large sacrificial knife. **kandil, kandi_l** = a globe of glass, a lantern (Ka.lex.)

jan.d. **khan.d.** = ivory (Jat.ki) **khan.d.i_** = ivory in rough (Jat.ki_); gat.i_ = piece of elephant's tusk (S.) [This semant. may explain why the dotted circle -- i.e., kandi, 'beads' -- is often depicted on ivory objects, such as ivory combs]. See also: **khan.d.iyo** [cf. khan.d.an.i_ a tribute] tributary; paying a tribute to a superior king (G.lex.) [Note glyph of a kneeling adorant]

Glyph: *khan:ghar, ghan:ghar, ghan:ghar gon:ghor* 'full of holes' (Santali)
Substantive: *kan:gar* 'portable furnace' (K.)



V245

V247 **khan.d.a** a division; a section (G.)

gha~_t. = protuberance of snout of alligator (A.) **gan.d.e** (Te.) gha~r.iya_l (A.B.); ghar.ya_lu = long-nosed porpoise (S.); gha~t. = protuberance on the snout of an alligator (A.)

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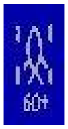
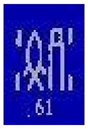
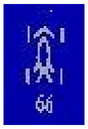
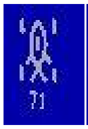
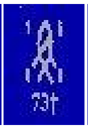
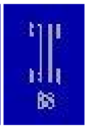
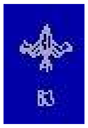
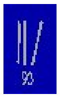
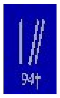
 Signs using four short strokes to subscribe another glyph. **gan.d.a** ‘a set of four’; *gan.d.a gut.i* to divide, to make up an account (Santali) *gan.d.i* hole, orifice (Te.); *kan.d.i, gan.d.i* opening, hole, window (Tu.)(DEDR 1176).



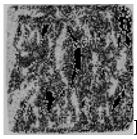
gan.t.ave_t.a = batfowling, nightfowling wherein lights and lowbells are used; **gan.t.a** = bat (Te.lex.)

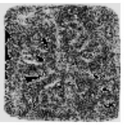
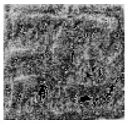
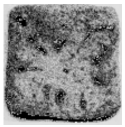
 **gan.d.e** ‘to place at a right angle to something else, cross, transverse’; *gan.d. gan.d.* ‘across, at right angles, transversely’ (Santali) [Note: A slanted line Lahn.d.a writing of accounts connotes a quarter; a straight line connotes ‘one’.]

Molded faience figurine with a hole in centre. Three ligatured monkeys. This miniature carved faience bead or pin ornament is possibly placed on a stick or cord. Possibly molded and carved. Material: yellow brown glazed faience; 1.6 cm. high and 1.4 cm. dia; Mohenjodaro K 1053. Marshall 1931: pl. CLVIII.5; after Fig. 8.23, Kenoyer, 2000.

ga~r.i~ = a monkey; sakam ga~r.i~ a small species of monkey (Santali) Monkey **gad.ava** = male monkey (Ka.); gad.d.i, **gad.d.e_** (Go.); **kat.uvan**= (Ta.)(DEDR 1140) [Note a seal where a monkey is shown in lieu of a standard device in front of a one-horned bull]. **sakam ga~r.i**~ a small species of monkey (Santali)

Substantive: **kan.d.i** = furnace (Santali)

A monkey is shown together with other animals on many seals: m440AC m0441Bt m1393t m1394t

   m1395At m1395Bt m0441At m0439t

[The motifs on m 439, m440 and m1393 to m1395 seem to be identical; on one side three or more tiger heads emanating from a body are shown; on another side a group of animals surrounding a horned lizard (gharial): two short-horned bulls facing each other, a rhinoceros, an elephant, a tiger looking back and a monkey (?) with face turned backwards.]

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Cylinder seal in Jemdet Nasr style of Sumer, shows two seated monkeys, in addition to typical glyphs of the Sarasvati Civilization. MS 4602

Apart from a seated monkey, the glyphs shown are:

three fishes, one of which is jumping up to the tail of one of the two tigers. [**hako** 'fish'; rebus: 'axe'; **a~s** = scales of fish (Santali); rebus: aya = iron (G.); **ayah**, **ayas** = metal (Skt.)]

A quiver with arrows, ligatured with two bows and other unidentifiable weapons within. (**sar, d.ol** = arrow); **bat.i** = a small brass bow; **khora** = a large brass bow; **d.ubha** = a metal bow (Santali) Rebus: **bat.i** = a metal cup or basin; **bat.hi** = a furnace for melting iron-ore (Santali)

Two tigers standing up with their heads turned backwards and being subdued by a standing person. (**kol** 'tiger'; rebus: 'metal'). **kaidau** = to subdue; rebus: **kaida** = a kind

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of knife with a curved blade; a big thick sickle, used to pollard trees or to cut branches (Santali)

A sprout with five petals (taberna montana, '**tagara**'; rebus: **tagara** 'tin') in front of the legs of the standing person.

Since the context is clearly a reference to **kol** 'metal' (rebus: 'tiger'), the cylinder seal depicts the metallic (bronze) weapons in possession of the seal owner.

Decoding of cuneiform in Gadd Seal 1 using lexemes from the substrate language

It is possible that the early lexeme for cassiterite or tin ore was '**kasa**'.

"aurichalcum…In the poetic phase, which loves the vague, this 'mountain-copper' was a mythic natural metal, ranking between gold and silver…Plato (the 'Critias' ix, treating of Atlantis, America) makes oreichalc, 'now known only by name,' the most precious metal after gold. Pliny (xxxiv.2) tells us truly enough that aurichalcum no longer exists…Festus speaks of 'orichalcum (copper), stannum (zinc or pewter?), cassiterum (tin), and aurichalcum (brass).'..When Dioscorides (v.cap.84) seems to allude to artificial or furnace-calamine, an impure oxide of zinc, he may mean the more modern tutiya (Avicenna), toutia, thouthia, cadmie des fourneaux, or tutty. Reduced to powder, and mixed with an equal quantity of wetted charcoal by way of fondant or flux, it is melted with copper to form brass…aurichalcum was made synonymous with electrum, natural or artificial…Brugsch (i.345) understands by '**usem**' brass, and thinks asmara or asmala equivalent to the Hebrew hasmal or hashmal = electrum. In Bunsen (v.757) **Kasabet** and **kakhi** are brass (aurichalcum), and **Khesbet** is a metal connected with **Kassiteros** = tin…Herodotus (iii.115), in the historic age (BCE 480-30), gives the name of the mythical metal to the 'tears of the Heliades,' which the Latins called succinum (succum), the Low-Latins ambrum, the Arabs anbar, and we Amber…The staters of Lydian Croesus, held by the Greeks to be the most ancient of coins, were, according to Bockh, of electrum, three parts gold and one part silver…" (Richard F. Burton, 1884, *The book of the sword* (repr. 1987), New York, Dover Publications, pp. 85-87).

Umma seal or Gadd Seal 1

If the cuneiform reading of this seal is: sak kasi, the lexemes may connote: **sak** 'shell or conch' and **kasi** 'cassiterite'. The bull may be read as: d.han:gar 'smith'. Thus the message of the seal is the possession of the smith or the commodities traded by the smith: shell and copper.

Gadd Seal 1 Seal impression and reverse of seal from Ur (U.7683; BM 120573); image of bison and cuneiform inscription; cf. Mitchell 1986: 280-1 no.7 and fig. 111; Parpola, 1994, p. 131: signs may be read as (1) *sag(k)* or *ka*, (2) *ku* or *lu* or *ma*, and (3) z*i* or *ba (4)?*. The commonest value: *sag-ku-zi* Or, SAG.KU(?).IGI.X or SAG.KU(?)P[AD]?

On the problem of the Indus (Sarasvati-Sindhu) Script, it is important to refer to one message on a sealing from Umma, since no bilingual script messages have so far been found: "...an imprint of (Indus (Sarasvati-Sindhu)) seal upon the fragment of a clay

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label from a bale of cloth had also been published by Father Scheil (*Revue d'Assyriologie*, Vol. 22: 56), and this was said to come from the site of Umma, the neighbor city of Lagash...No.1. First among the seals discovered at Ur (in 1923) is the unique object ...in the British Museum...On the face stands, below, the figure of a bull with head bent down...the inscription...is in archaic cuneiform writing...of a period before 2500 BCE There are three signs and very probably traces of a fourth, almost obliterated; the three preserved are themselves scratchy and rather worn, though not ill-formed. Hence their reading is doubtful--the choices are, for the first SAG(K) or KA, for the second KU or possibly LU, while the third is almost certainly S'I, and the fourth, it existed at all, is quite uncertain...using the commonest values of the signs, sak-ku-s'i--(with possible loss of something at the end) may be pronounced the best provisional reading...It does not, at least, seem to be any Sumerian or Akkadian name...(the seal is) probably, a product of some place under the influence both of Indus (Sarasvati-Sindhu) and of the Sumerian civilizations." (Gadd, 1932, pp.3-32.)

The seal is a 'rosetta stone' available to provide a lead to decode the epigraphs of Sarasvati Civilization. It is a 'rosetta stone' because it contains a message written in a known script: the cuneiform. Assuming that the inscription in cuneiform on this seal is a transliteration of morphemes of the language of the civilization, an attempt may be made to relate the messages in terms of the general pattern of the use of pictorial motifs to convey weapons and tools.

The possible rebus lexemes conveyes by **sak lu**… are: **sak** = conch shell; **luhia, luiha** = an iron vessel or pot used for cooking and other purposes; loha luti = iron utensils and implements (Santali) The bull is **d.han:gar**; rebus: blacksmith.

Entries from the *Indian Lexicon*: *sag, zag* ‘a conical form; the teat’; the dug of a beast (G.) *sagan* ‘an iron nail fixed in the pole of a plough for fastening the yoke’ (G.) kus' a ploughshare (Skt.), *kos'* ‘an iron bar sharpened at one end, used as an instrument for digging’ (G.) *kus* ‘a hand-held implement for turning up of clods--a pole with an iron blade or a head: also the iron member of this implement’ (M.)

Reading: **sag ka-si-ta**

Rebus: **saga** denoting pha_tries or clans in Gond.; *kase_ra_* metal worker (L.); kasera_ worker in pewter (P.Bi.H.); kasero maker of brass pots (N.);

Alternative: **kusi_da** = usurer. *kasat.iyo* a pawnbroker, a money-lender (G.)

kasa = quality of gold or silver (as determined by rubbing it on a touch-stone); kas. To rub, to test (Skt.); kas = pith (Arabic); kas = remunerativeness (of a trade)(G.) kasan. = rubbing, testing; kasan.uvum = to mix by gradually rubbing the ingredients together, to

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mix by rubbing (G.) kasot.i_ (kasa 'rubbing' + vr.tti 'a circle') a touchstone, generally round in form; making a trial, ann experiment (G.)

Rebus: **kan:ka** = a metal (Pali); **kan-** = copper (Ta.) **kanaka** = gold; kanaka_dhyaks.a = superintendent of gold, treasurer (Skt.) **kan-n-a_r,** blacksmiths, coppersmiths (Ta.) Glyph: **kanka, kan.d.a kanka** 'rim of pot' (Santali)

Rebus: *kase_ra_* metal worker (L.); kasera_ worker in pewter (P.Bi.H.); kasero maker of brass pots (N.); Glyph: pannier depicted on a heifer (one-horned bull). **kha_siyum** = a double bag to load a donkey with (G.) ka_sad (Arabic) a messenger, a carrier; a runner; ka_sadiyum = serving as a messenger, carrying a message (G.) kaccha, kaccho = a piece of cloth worn round the loins (Dh. Des. kaccha_ fr. Skt. kaks.a, kaks.a_, kaccha 'the hem of a lower garment tucked up into a waistband'] (G.) kaso = to plait, a frill, a plait; kaskasao = to tighten, to pull tight, pull together; kaci, kacni = a piece of cloth worn round the loins as a skirt; kaci, kaca = a piece of cloth worn round the loins (Santali) kaccai = girth, girdle; kaccu = belt, girdle (Ta.); kacca = girdle, waist-belt, long cloth (Ma.); kacce = end of lower garment gathered up behind and tucked into waistband (Tu.)(DEDR App. 20; CDIAL 2592; Skt. kaks.ya_; cf. Pali. Pkt. kaccha_).

kan.d.a = a pot of certain shape and size (Santali)

Rebus: **kan.d.** = altar, furnace (Santali) **khan.d.a** = instrument, implement, weapon; khan.d.a puruskedae, he stretched his arm grasping the sword as high as he could; **khan.d.a bhan.d.a** = implements of all kinds, arms of all sorts (Santali.lex.) **khan.d.a puruskedae**, he stretched his arm grasping the sword as high as he could (Santali.lex.)

Copper work; brazier: **kan** copper work, copper; kan- n-a_n brazier (Ta.); bell metal worker, one of the divisions of the Kamma_l.a caste (Ta.lex.) kanna_n id. (Ma.)(DEDR 1402). kan workmanship (Tiv. Tiruva_y. 5,8,3); kan mam (Tiv. Tiruva_y. 6,2,7)(Ta.) kanaka = a metal (Pali); kanaka = gold (Skt.)

kan.d. furnace, altar (Santali) gan.d.a pit (furnace) **kan.d.i** = furnace, altar; khandha = a trench used as a fireplace when cooking has to be done for a large number of people (Santali.lex.) **kandaka** = a ditch, a trench (Ka.); khandaka (M.H.Te.)(Ka.lex.) This lexeme can be denoted by the dotted circle which is often depicted on ivory (**khan.d.**) objects. *khan.d.ar.an:, khan.d.run:* 'pit (furnace)' (Santali)

bat.hi furnace for smelting ore (the same as **kut.hi**) (Santali) **bhat.a** = an oven, kiln, furnace; make an oven, a furnace; **it.a bhat.a** = a brick kiln; **kun:kal bhat.a** a potter's kiln; **cun bhat.a** = a lime kiln; cun tehen dobon bhat.aea = we shall prepare the lime kiln today

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(Santali); **bhat.t.ha_** (H.) **bhart** = a mixed metal of copper and lead; bhart-i_ya_ = a barzier, worker in metal; bhat., bhra_s.t.ra = oven, furnace (Skt.) **me~r.he~t bat.i** = iron (Ore) furnaces. [Synonyms are: me~t = the eye, rebus for: the dotted circle (Santali.lex) bat.ha [H. bat.t.hi_ Sad.] any kiln, except a potter's kiln, which is called coa; there are four kinds of kiln: cunabat.ha, a lime-kin, it.abat.ha, a brick-kiln, e_re_bat.ha, a lac kiln, kuilabat.ha, a charcoal kiln; trs. Or intrs., to make a kiln; cuna rapamente ciminaupe bat.hakeda? How many limekilns did you make? Bat.ha-sen:gel = the fire of a kiln; bat.i [H. Sad. bat.t.hi, a furnace for distilling) used alone or in the cmpds. Arkibut.i and bat.iora, all meaning a grog-shop; occurs also in ilibat.i, a (licensed) rice-beer shop(Mundari.lex.)

bhat.i = liquor from mohwa flowers (Santali)[x]

Bull's head (bucranium) between two seated figures drinking from two vessels through straws. Yale tablet. YBCE.5447; dia. c. 2.5 cm. Possibly from Ur. Buchanan, studies Landsberger, 1965, p. 204; A seal impression was found on an *inscribed tablet (called Yale tablet) dated to the tenth year of Gungunum, King of Larsa, in southern Babylonia--that is, 1923 BCE according to the most commonly accepted ('middle') chronology of the period. The design in the impression closely matches that in a stamp seal found on the Failaka island in the Persian Gulf, west of the delta of the Shatt al Arab, which is formed by the confluence of the Tigris and Euphrates rivers. We find that on the top register, above the bull's head, the Yale tablet shows two squares with divisions flanking a circle while in the Failaka tablet shows two birds with wings flanking a tree (or corn stalk).

The occurrence of pictorials and glyphs (signs) in pairs can be explained as an 'alloyed' version of the metal connoted rebus by the respective pictorial or glyph:

bagr.a (Sad.) = the condition of being mixed largely in different varieties; adj. used of grains, seeds, pulses, of which different varieties have been mixed in large or nearly equal proportions; bagr.a-o to be mixed, used of grains and also of men or animals of mixed blood (Mundari.lex.) bagr. adj. Mixed, impure; mix up; bagar. = mixed, not of one kind or quality, impure; untidy; bagar. caole = mixed rice (clean and not clean, or different kinds)(Santali); bagar. (H.)(Santali.lex.Bodding) baggad.a = sediment, settlings, dregs as of oil, the mud or mire in a well, cow-dung mixed with water (Ka.); vagal.a refuse, dregs; van:gal.a bad, foul, nasty (M.)(Ka.lex.) 'Doubling' may be connoted by the lexeme, **barea** = two or, **'bagad.o'** = the figure 2 (G.lex.) [**bagr.a, baggar.a, bagar.ao** = adj., used of grains, seeds, pulses, of which different varieties have been mixed in large or nearly equal proportions; condition of being mixed largely in different varieties; for a mixture in lesser proportion **boja** is used (Mundari.lex.) bagar., bagr.a = mixed, impure, confused; cf. bagar. (H.); bagar. is used mostly about rice, and bagr.a more about what is different in kind; bagr.i = adj. Mixed, impure; mix

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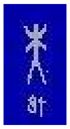
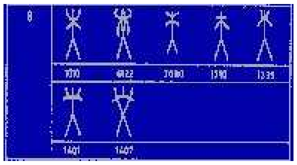
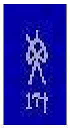
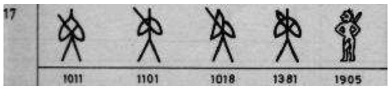
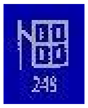
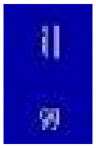
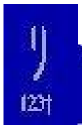
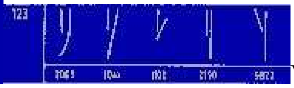
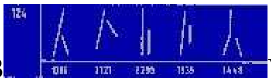
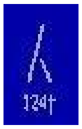
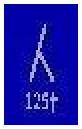
up, spoil by bringing foreign matters (Santali.lex.) Could the term, **bagr.a** have connoted an **alloyed ore** used for making the double-axe?] *bagad.avum* 'to be adulterated'; *baga_d.*, *baga_d.o* adulteration (G.)

ban:guri_ = a kind of hoe used for hoeing sugarcane (P.lex.)

The nature of an alloy can also be represented by using a homonym of **bagad.o** which is glyptically depicted as two linear strokes or a glyph shown as a pair..

  V008   V017 **bhat.a** = a warrior (G.lex.) bhad.a a warrior; a hero; adj. Strong, mighty; opulent; an opulent person (G.lex.) **bhar.** = soldier (B.); warrior (G.); hero, brave man (Ku.); bhat.a = hired soldier (MBh.) pat.ai = army, weapons, battle (Ta.); pat.a = battle, army (Ma); pad.eyila = soldier (Ka.); pad.eval.a = a general (Ka.); pad.ava = fight, battle; pad.avalamu = van of an army; pad.ava_lu = commander of an army (Te.)

 **bata** = lattice work, inter-lacing (Santali.lex.)

   V123  V124   **badhi** = 'to ligature, to bandage, to splice, to join by successive rolls of a ligature' (Santali) **bata_** bamboo slips (Kur.); **bate** = thin slips of bamboo (Malt.)(DEDR 3917). Ligature! **badhi!** This becomes a characteristic feature of the orthography of epigraphs.

Naha_li_ **baddi_** = ox ; **pa_d.o_** = bull (Sikalga_ri_, mixed Gypsy language.)(CDIAL 9176). **bal.ad** = an ox; a bullock; a bull (G.lex.) baredi_ = herdsman (H.); baldi_ = oxherd (P.); baldiya_ cattle-dealer (Ku.)(CDIAL 9177). bali**varda** = ox, bull (TBr.); baleda_, baled = herd of bullocks (L.); baledo (S.); bald, baldh, balhd = ox; baled, baleda_ = herd of oxen (P.); bahld, bale_d = ox (P.); balad, bald = ox (Ku.); **barad** (N.); balad(h) (A.); balad (B.); bal.ada (Or.); **barad(h)** (Bi.); barad (Mth.); barad (Bhoj.);. bardhu (Aw.); balad, barad(h), bardha_ (whence baladna_ to bull a cow (H.); bal.ad (G.)(CDIAL 9176). **pa_r-al** = bull (Ta.)(DEDR 4020). **bare itat** = a bullock given at marriage by bridegroom to bride's brothers (Santali.lex.) baro barabbar = opposite, face to face; baro, baron. = provisions, food rations, supplies (P.lex.) barotwa_la_ = a partner (K.)(P.lex.)

There is another semantic stream, **vad.d.e** (Telugu), **vad.d.haki** (Pkt.), [?***barad.a**] connoting, respectively, a digger of tanks (perhaps the same group of people who had the competence to createa rock-cut reservoir in Dholavira) and carpenter, mason.

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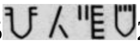
To depict him pictorially, in a writing system, a backbone (**barad.o**) or a bull (**baradh**) or a kneeling adorant (**bharad.o**, 'devotee of S'iva') are depicted, since all these semantics are represented by a word which sounds similar to the word used to connote an artisan -- a mason, a carpenter, a worker in wood and metal: ***barad.o (vardhaki). barduga** = a man of acquirements, a proficient man (Ka.)

To add greater precision in the message conveyed , other pictorials -- as semantic determinants -- may be ligatured; for e.g. a trough may be shown in front of a bull; the trough is **d.han:gar**; a rebus representation of **d.han:gara, t.hakkura**, 'blacksmith'. A new principle in the writing system emerges: ligaturing as a means of conveying multiplicity of functions performed or alloys created, using multiplicity of ores and metals.

bad.hi ‘a caste who work both in iron and wood’ (Santali)[xi] **bar.ae** = a blacksmith; bar.ae kudlam = a country made hoe, in contrast to cala_ni kudlam, an imported hoe; **bar.ae** mer.ed – country smelted iron; **bar.ae** muruk = the energy of a blacksmith (Mundari.lex.) bar.ae = bad.ae (Santali.lex.) **bari_** = blacksmith, artisan (Ash.)(CDIAL 9464). The occurrence of **bari_** in Ash. (CDIAL 9464) and **bar.ae** in Mundari and of **vardhaka** in Skt. point to the early phonetic form: **bard.a**; semantic: worker in iron and wood, artisan. Thus, it is suggested that the depiction of the backbone, barad.o is rebus for **bard.a**, artisan. **barduga** = a man of acquirements, a proficient man (Ka.)

m1135  2140 Pict-50 Composite animal: features of an ox and a rhinoceros facing the standard device. This seems to indicate that the lexeme connoting the young bull may have be cognate with a lexeme connoting a boar. **badhia** = castrated boar, a hog; **bhator. sukri** = a huge wild boar with large tusks; rata sukri = a boar in hunting parlance; sukri kud.u = a boar; datela sukri = a wide boar (Santali.lex.) basa, **bara** (Has. Syn. of ekend.a, Nag.) = a male wild boar, whether living with one female (larger kind) or leading a herd (smaller kind) (Mundari.lex.)[xii]

Glyph: *badhor.* ‘a species of fish with many bones’ (Santali)

bat.i = a cup of metal; various sizes and shapes are distinguished by a prefixed word: **adhoili bat.i** = an eight-anna cup, of a middling size; **car ana bat.i** = a small size cup; baro ana bat.i = a cup originally costing twelve annas; **bin.d.i bat.i** = a cup with a rim below, to make it stand; chip bat.i = a small flattish cup or dish; **dul bat.i** = a cup made by casting, not by beating; **jam bat.i** = a large cup, mostly of **ka_sa_,** especially for drinking purposes; **khan:ka bat.i** = a cup with a flat rim (only the larger kinds, suitable for pouring out fluids; **khora bat.i** = cooking pot; **laua bat.i** = a cup similar to a lot.a, but without a neck; mi~r.u~ bat.i = a cup without an outstanding flat rim (khan:ka); **sunum bat.i** = a small cup used when anointing oneself with oil (Santali) **bat.i** (Desi) **bat.i** = a metal cup or basin; bhat.i = a still, a boiler, a copper; dhubi bhat.i = a washerman’s boiler; jhuli bhat.i = a trench in the ground used as a fireplace when cooking has to be done for a large number of people (Santali.lex.) bha~utic = a leaf cup, a cup made of leaves pinned together (Santali.lex.)

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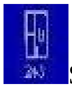
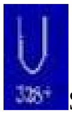
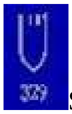
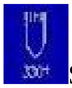
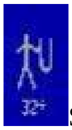
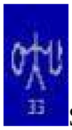
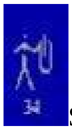
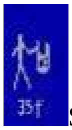
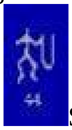
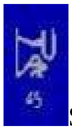
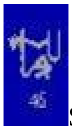
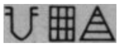
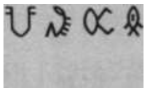
bat.i = rimless vessel.[xiii]  Sign 243  Sign 328  Sign 329  Sign 330
Sign 218  Sign 32  Sign 33  Sign 34  Sign 35  Sign 44
 Sign 45  Sign 46

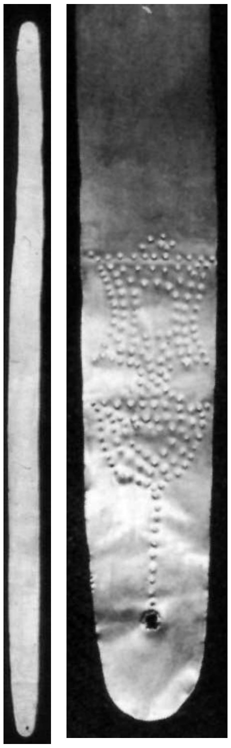
ka_t.i = fireplace in the form of a long ditch (Ta.Skt.Vedic) **ka_t.ya** = being in a hole (VS. XVI.37); ka_t.a hole, depth (RV. i. 106.6) **kha_d.** a ditch, a trench; **kha_d.o khaiyo** several pits and ditches (G.) *khan.d.run:* 'pit (furnace)' (Santali)

bhin.d.ia 'a lump, applied especially to the mass of iron taken from the smelting furnace'; *bed.a* 'ingot' (Santali) *bi_d.u* dross, alloy of iron (Tu.); iron filings or dust (Te.)(DEDR 4218)

khat.a = six (G.)

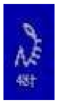
m0269  2663

h171A h171Btablet  4312



Buffalo. m0312 *kad.ru* 'buffalo' (G.); **kad.a** buffalo (Santali) **kat.ra_** bull calf; kat.hr.a_ young buffalo bull; **kat.iya_** buffalo heifer (H.); kat.r.a buffalo calf (WPah.); kat.ai buffalo calf (Gaw.); kat.r.a_ young buffalo (P.)(CDIAL 245). **kat.a_damu** = a he-buffalo (Te.lex.)[xiv] *ko_r.i* buffalo (Kond.a); *kud.ru* (Pe.Mand.); *ko_ru pl. ko_rka* (Kui); *ko_d.ru, ko_dru, ko_d.ru, go_d.ru* (Kuwi)(DEDR 2256).

Thus, the following pairs of glyphs which combine with Sign 342 (the rim of jar) can be explained in the context of metal workers' repertoire.

 (17) (16)

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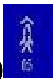
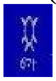
(16) (40)
 (65) (43)

Sign 155: **kan.d.a, ka_n.d.a, ka_d.e** = an arrow (Ka.) **ka_n.d., ka_n., ko_n., ko~_, ka~_r.** arrow (Pas'.); **ka~_d.i_** arrow (G.)

Glyph: **kan.** = arrow, wooden handle of a hoe, pickaxe or other tool (Ta.)(DEDR 1166).
Rebus: **kan-** = copper (Ta.)

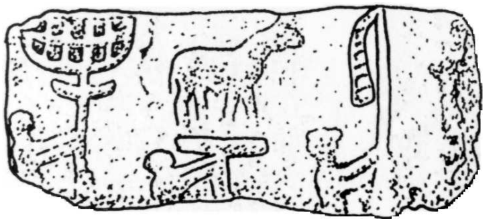
1.Finely burnished gold fillet (headband) with holes at both ends to hold a cord. Each end is decorated with a punctuated design of standard device. 42 x 1.4 cm. Mohenjodaro Museum, MM 1366; Marshall 1931: 220.527. Pl. CXVIII, 14 (for punctuated design)
2. Detail of gold fillet with punctuated design of standard device at both ends of the gold fillet. (After Fig. 7.32, Kenoyer, 1998)

The standard device is a ligature of a lathe and a portable furnace. It is **san:gad.a**

A stylized standard device? *san:gad.a*, 'portable furnace'.

Standard device. Centre: carved in ivory (HR 93-2092) flanked by device depicted on faience tablets (HR 90-1687, H93-2051), Harappa

Processional scene from a terracotta tablet. After Marshall 1931, Pl. CXVIII,9 The heifer is **damr.a**; rebus: **tambra** 'copper'; the standard is **san:gad.a**; rebus: 'furnace'. **sagal.a** = pair (Ka.); **saghad.i_** = furnace (G.)



Is this a representation of a public ceremony which included carrying standards topped by objects representing important motifs of the civilization? Not all animals with which the people of SSVC were familiare are used as pictorial motifs; for example, they were familiar with peacocks, hooded cobras, monkeys, squirrels, mongooses and onagers (wild asses); the pictorial representations of these animals are not found on the square stamp seals.

A procession carrying (fr. right) a pennant, a one-horned bull and a standard device is depicted on an inscribed object. This seems like an army on the march. [cf. bavaramu = a battle, fight, combat, war (Te.)]

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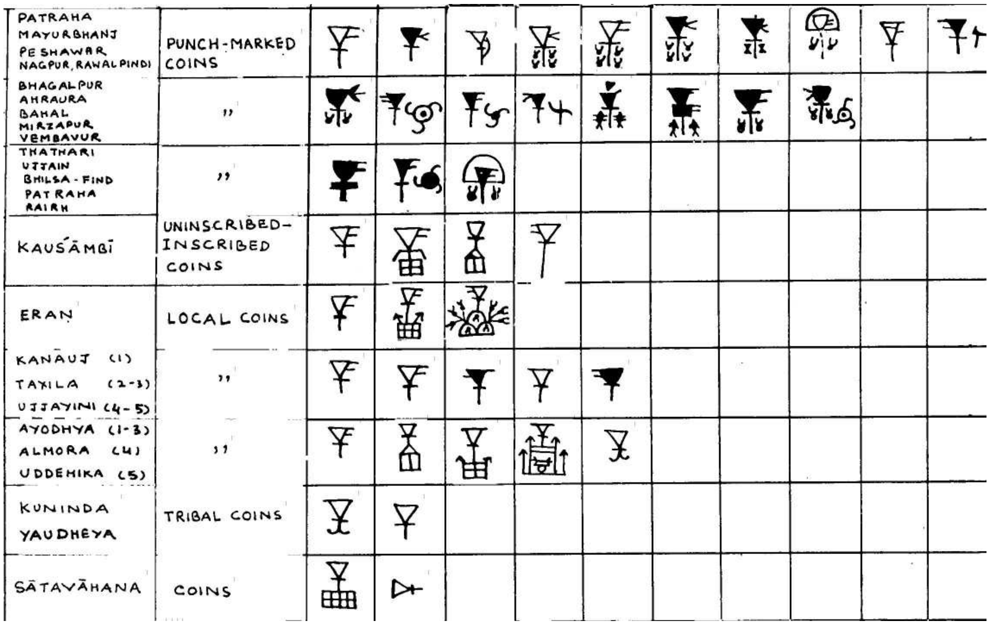
The standard device occurs in over 1,000 epigraphs, generally shown in front of the one horned heifer. It is suggested that this device is a ligature composed of a gimlet drill lathe superimposed on a portable furnace which is represented by the bottom vessel. The device was clearly an important part of the lives of the people who created the epigraphs; it is shown being carried in a procession; a replica of the device also exists in the round. There is one lexeme in Bharatiya languages which explains the ligatured components: **san:gad.a** The rebus substantive is consistent with other glyphs denoting the property items of braziers.



[Pl. 55, Standard symbol on punch-marked coins and on local coins; this is paralleled by the standard device in front of the one-horned bull shown on many inscribed objects of SSVC].

2103
m0021a

m0029a

2033

Pict-123 Standard device which is normally in front of a one-horned bull. The device is flanked by columns of dotted circles.

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h384 h434 h399

h887Ait h887Bit [Incised tablet] Pict-122 Standard device which is normally in front of a one-horned bull.

jan:gad.iya_ pl. military guards who carry government treasury from one place to another (G.lex.)

Standard device with dotted circles decorating the portable furnace (with emanating smoke); a gimlet is ligatured on top of the standard with wavy lines denoting churning, turning motion (of a lathe). **sangha_d.o (G.) = cutting stone, gilding; san:gatara_s'u_ = stone cutter; san:gatara_s'i = stone-cutting; san:gsa_ru karan.u = to stone (S.), can:katam = to scrape (Ta.), san:kad.a (Tu.), san:kat.am = to scrape (Skt.)**

san:gad.a, portable furnace, lathe; **san:gha_d.iyo**, a worker on a lathe; san:gha_ta, killing; jan:gha_d.iyo, military guard accompanying treasure into the treasury (G.)

See the ligatured lathe, with smoke emanating from a portable furnace (m008: **san:gad.i**); see the cage-like component on the device (m026: **ku_t.u**); see the device carried on a person's shoulder (h196); see the pointed edge of the top part of the device, suggesting a gimlet of a lathe on inscribed objects (m1203: **tamiru**); the device is also known from Harappa as an ivory object in the round (discovery by Meadow and Kenoyer during the archaeological campaign at Harappa in 1998).

sa~gad. = a body formed of two or more fruits or animals or men and linked together (M.)(CDIA 12859). san:gha_r.iba_ tie two cattle together and leave to graze (G.)(CDIAL 12860). saga_d.i_ = Skt. yugalam, a couple (Hem.Des. G.lex.) [Note the ligaturing techniques on inscribed objects]. See ligatured bodies of animals or people on glyphs ! Sarasvati hieroglyphs !

m1171 Amri06 Ligatured animal **san:gad.i** = joined animals (M.)
san:gad.a = army; jan:gad.iyo = military guards who carry government treasury from one place to another; ja_n:gad.= things given for approval (taken without definite settlement of purchase).

The ligatured animal may connote the heads of a short-horned bull, a one-horned bull and an antelope ligatured to the body of a bull – a rebus representation of three people working together: va_kara (warrior), d.han:gar (blacksmith), mer.h (clerk of a merchant). Alternative: three minerals: **damr.i** ‘heifer’; **ta_mbra** ‘copper’; **bali** ‘bull’; **bali** ‘iron ore’; melh ‘goat’; **melukka** ‘copper’.

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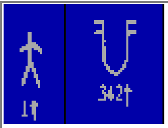
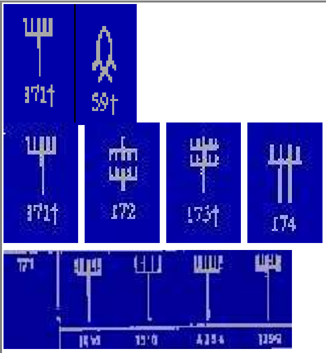
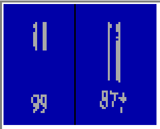
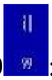
m1170a 1382 Composite animal Is the ligatured ‘comb’ glyph (bakhor.) + vad.d.h, ‘ears of corn’; **bad.d.ha_,** ‘stumps of stalks’ [Rebus: **bad.hoe** ‘carpenter’]; alternative: **pasra** ‘sprout’; **pasra** ‘smithy’, **pajhar.** ‘furnace’. Alternative decoding of Sign 176: Comb **kangha** (IL 1333) ka~ghera_ comb-maker (H.) **kan:g** = brazier, fireplace (K.)(IL 1332) Portable brazier; **ka~_guru, ka~_gar** (Ka.) whence, large brazier = **kan:gar** (K.)

ta_mbum = copper (G.); ta_mra (Skt.); ta_mba_ na_n.um = copper coin; ta_mba_ va_d.ako = a porringer made of copper; ta_mba_ kun.d.i_ a copper trough in which water for bathing is kept; ta_mbad.i_ = a copper pot (G.)

Stable pairs of signs

There are some stable sequences of signs in inscriptions, stability being measured by the frequency of occurrence of two signs within each inscription.

There are five pairs with between 65 and 87 occurrences in the inscriptions.

	ten:go, ‘to stand’; ten:go, ‘to assume responsibility Rebus: tan:kam = pure gold (Ta.Ma.); t.an:ka = a stamped (gold) coin (Skt.)(DEDR 3013). mountain **kan.d.,** ‘pot’; **kan.d.,** ‘furnace’ [i.e. person managing a furnace]. te_jate_ = is sharp, sharpens (RV); te_jati = is sharp, shapens, incites (Pali); te_ai sharpens (Pkt.); tevn.e~ = to shine, burn (M.)(CDIAL 5945). Te_jas = sharp edge of a knife, glow (RV); fiery energy (AV); te_h = fire, arrogance (K.)(CDIAL 5946) tega = a sword; tega_ = a scimitar (G.Persian) tega_r = property, substance (G.Persian)
 V171	**ken.t.a** ‘fish’; **ke~r.e~** brass or bell-metal; Alternative 1: hako, ‘fish’; hako, ‘axe’; Alternative 2: **a~s** = scales of fish (Santali); rebus: aya = iron (G.); **ayah**, **ayas** = metal (Skt.) kun.t.e, **khu~t.i**, ‘harrow, stake’; **kut.hi**, ‘furnace’ Alternative: **ad.ar** ‘harrow’; **aduru** ‘native metal’
	**ib** 'two' (Ka.); rebus: **ib** 'iron' (Santali) Sign 99: *at.ar* a splinter; *at.aruka* to burst, crack, slit off, fly open; *at.arcca*

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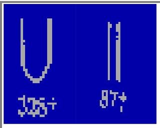
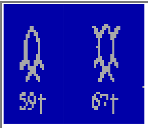
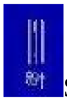
	splitting, a crack; *at.arttuka* to split, tear off, open (an oyster)(Ma.); *ad.aruni* to crack (Tu.)(DEDR 66). Rebus: **aduru** ‘native metal’ (Ka.) san:gad.a, ‘two’; san:gad.a, ‘portable furnace’; sal, ‘splinter’; sal, ‘workshop’ OR **kin** ‘two’ rebus: **gina** ‘metal vessel’ Alternative decoding for Sign 99: **por** space between joints (H.); per joint, articulation (M.) Two, pair **par** (To.) **por-** ‘to sell’ (Ko.) **bari_** = blacksmith bari_ = anvil
	**bat.i** 'wide-mouthed metal vessel' (H.) rebus: **bat.hi** = smelting furnace, kiln (Santali) **bhra_s.t.ra** (Skt.) The pair could mean 'iron smelting furnace' san:gad.a, ‘two’; san:gad.a, ‘portable furnace’; kamat.ha, ‘wide-mouthe pot’; kammat.a, ‘furnace, coinage, mint’ Alternative readings of the ‘pot’ glyph: Glyph: *mer.go* ‘rimless vessel’; Rebus substantive: *meruku* ‘shine, glitter, silver’ Broad-mouthed pot ka_t.a = vessel for holding liquid (KS. X.6.4); ka_t.i (Ta.), kha_ri_ = a measure of capacity for grain (Ta. S.I.I., iii,9) **ka_t.i-**cca_l = broad-mouthed pot for keeping sour rice water (Ta.); ka_t.icca_lmu_lai = NE corner where waster water is emptied in a pot at a sacrifice (Ta.); gad.d.a proyyi = a fireplace or hearth with 3 or 4 inverted hemispherical clods placed on it (Te.) Rebus: **ka_t.i** = fireplace in the form of a long ditch (Ta.); ka_t.ya = being in a hole (VS. XVI.37); ka_t.a hole, depth (RV. i. 106.6) **ka_t.i** (Ta.) knife
	**ken.t.a** ‘fish’; **ke~r.e~** brass or bell-metal; Alternative: hako, ‘fish’; hako, ‘axe’; **a~s** = scales of fish (Santali); rebus: aya = iron (G.); **ayah**, **ayas** = metal (Skt.) Sign 67 with four scales may be a count of ‘four’, **gan.d.**; rebus: **kan.d.** ‘furnace’. kor-r-a, ‘a fish’; *kot.ra hako* a species of fish (Santali); **kor-r-a**, ‘mason’

Sign 89 **tebr.a** = three (Santali)

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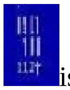
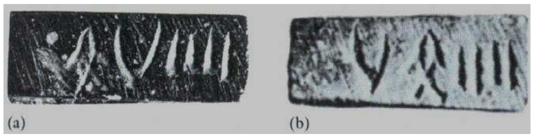
Sign 112 is composed of four and three short strokes.

Sign 104 (70) **pon**, ponea, ponon = four (Santali)

Rebus: pon, hon = a gold coin, the half of a varaha (Ka.); honnu = gold (Ka.); ponnu (Te.); **pon-, por-** = metal, gold, luster, beauty (Ta.); pol = gold (Ma.)

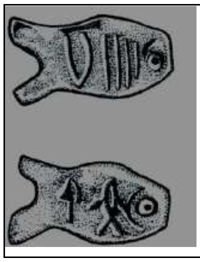
Alternatives for three and four short-linear strokes:



Glyphs: gan.d.a **'four';** pene **'three';**
Rebus: kan.d. **'furnace';** pen.e **'griddle'**

Harappa. Fish-shaped tablet (3428) incised. Eye is a dot in circle. Drawn after Vats 1940: II, pl. 95, no.428; cf. Asko Parpola, 1994, Fig. 10.22, p. 194.

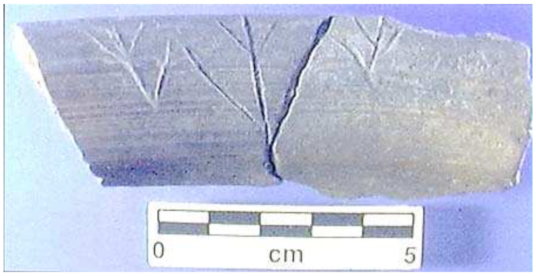
Why the inscriptions cannot be sentences or personal names



It would be a surprise indeed if, in a writing system used ca. 5000 years ago, it was possible to compose sentences using just five signs.
Hundreds of inscribed texts on tablets are repetitions; it is, therefore, unlikely that hundreds of such inscribed tablets just contained the same 'names' composed of just five 'alphabets' or 'syllables', even after the direction of writing is firmed up as from right to left:

There are 123 copper tablets with inscriptions excavated at Mohenjo-daro. Most of the tablets contain only one line inscriptions excepting on four tablets which have a second line. [See BM Pande, 1979, Inscribed copper tablets from Mohenjo-daro: a preliminary analysis in: GL Possehl, 1979, *Ancient Cities of the Indus*, Delhi, Vikas].

Signs which pair with Sign 104: (21) (24) Pairing signs could be graphemes or variants of the same glyph, i.e., glyphs connoting the same lexeme. **tagara** = taberna montana (Skt.) Rebus: **t.agromi** = tin metal alloy (Kuwi) If distinct, Sign 161 could be **koli** 'stubble'.



Rebus: **t.agromi** = tin metal alloy (Kuwi)

Glyph 1 **: t.agara** = *taberna mntana* (Skt.)

Ravi potsherd with an early writing system (Harappa, 1998 find; after Kenoyer Slide 124)

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It is likely that we are dealing with one of the earliest inventions of writing in the world; the earliest epigraph of the civilization has recently been discovered (year 2000) at Harappa on a potsherd. This stratigraphically dated (circa 3300 BCE) discovery is close to the date of the early writing system using cuneiform on clay tablets in Mesopotamia or Proto-Elamite tablets (dated circa 4th millennium BCE).

Glyph 2: **tagara** = antelope, ram (Skt.)

Tabernae Montana coronaria

Tabernaemontana amsonia 4077.Wax-flower: takaram wax-flower dog-bane, tabernaemontana; aromatic unguent for the hair, fragrance (Ta.); takaram tabernaemontana coronaria (Ma.); tagara id. (Ka.); t.agara (Pkt.)(DEDR 3002). Tabernaemontana coronaria, tabernaemontana heyncana: nandivraksha, tagara (Skt.); chandni, tagar (H.); siulicop, tagar (B.); East Indian rose-bay wax-flower plant, ceylon jasmine (Eng.); nandivardhanamu (Te.); nandiyavertam, gandhitagarappu (Ma.); maddarasagida (Ka.); vadli namdit (Konkan.i); is met with in Bengal and south India. Root contains resin, extractive matter and a bitter alkaloit... root or bark is chewed for the relief of toothache... root rubbed with lime-juice is applied to remove opacities of the cornea... milky juice of leaves is dropped into the eye to cure ophthalmia. (Indian materia Medica, p. 1189). cf. tagara a shrub with fragrant white flowers, cultivated in gardens, tabernaemontana coronaria (Ka.lex.) takara-ja_r..al an aromatic unguent for the hair, mayircca_ntu (Nan-. 368, Mayilai.); tagaram wax-flower dog-bane, tabernae montana (Ci_vaka. 349); aromatic unguent for the hair (Kur-in~cip. 108); fragrance (Aka. Ni.)(Ta.lex.) tagara the shrub tabernaemontana coronaria and a fragrant powder obtained from it (Kaus'.); tagaraka (VarBr.S.); sthagara, sthakara a partic. fragrant powder (TBr.); tagara (Pali); takara (Dhp.); tagara, t.ayara a kind of tree, a kind of scented wood (Pkt.); tuvara, tra a species of cassia plant (Si.)(CDIAL 5622).

tagara = the shrub *tabernaemontana coronaria* and a fragrant powder obtained from it (Kaus'); tagaraka (VarBr.S.); sthagara, sthakara = a particular fragrant powder (TBr.); tagara (Pali); takara (Dhp); tagara, t.ayara a kind of tree, a kind of scented wood (Pkt.); tuvara, to_ra a species of cassia plant (Si.)(CDIAL 5622). Tuvarala_ an incense prepared from a species of tabernaemontana (Si.); tagaravalli_ cassia auriculata (Skt.); tagaravalli_ cassia auriculata (Skt.); tuvarala_ an incense prepared from a species of tabernaemontana (Si.)(CDIAL 5624). tagara tabernaemontana coronarea, an ingredient of perfumes (Jain.Skt.); bignonia chelonoides (Skt.); delphinium brunonianum (Car. Su. 4.42, Ci. 3.268). nata synonym of tagara (Car. Su. 3.23,28). Delphinium ajacis: larkspur seed, field larkspur, feldritterspornsamen (Ger.); part used: the dried ripe seed; habitat: Europe; use: externally as tincture as a parasiticide in pediculosis; internally its action resembles aconite. (Heber W. Youngken, Textbook of Pharmacognosy, Philadelphia, The Blakiston Co., 1950, pp. 337-338). Aromatic unguent: kokke-gid.a tabernaemontana coronaria a shrub with fragrant flowers cultivated in gardens (Ka.lex.); kokke-ka_yi fruit of the tree tabernaemontana coronaria (Tu.)(DEDR 2035). nandi bat.lu gid.a a shrub with fragrant white flowers, cultivated in gardens, tabernaemontana

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coronaria (Ka.); nandya_varta, nandi-vat.t.a (Ka.)(Ka.lex.) The juice of the flowers is mixed with oil is used to relieve the burning sensation of sore eyes; is rubbed into the head to cure pain in the eyes. (Medicinal Plants of the Philippines, p.739). Ervatamia coronaria = ervatamia divaricata = tabernaemontana coronaria: tagar (B.M.H.Skt.); nandiyavattam (Ta.); gandhitagarapu (Te.); wood: refrigerant; milky juice: used for diseases of eye; root: acrid, bitter, used as local anodyne and chewed for relief of tooth-ache; habitat: upper gangetic plain, Garhwal, E. Bengal, Khasia Hills, Assam, N. Circars and hills 9f Vizagapatam (GIMP, p.110).

eruvai copper, blood (Ta.); *ere* a dark-red or dark-brown colour (Ka.)(DEDR 817). *ere* black soil (Ka.)(DEDR 820). *ke~r.e~ ko~r.e~* an aboriginal tribe who work in brass and bell-metal (Santali) *ker.e sen:gel* fire in a pit (Santali)

ero = watering place for cattle (G.)

er-aka = upper arm, wing (Te.) [Note the orthographic emphasis on the wing of a bird or the raised arm of a person standing ligatured to the buttocks of a bovine.]

Glyph: **tagar.** = a trough; tagar.re surti ar cunko sipia they mix surti and lime in a trough (Santali.lex.) **taga_rum** [Pers. **tagarih**] a bricklayer's trough; a hod (G.lex.) [Is this a representation of a trough shown in front of the short-horned bull and other animals on many seals? The possibility is enhanced because the shrub also appears in front of a short-horned bull.] **tagar.a** = syn. of **masala gar.a**, a pit for preparing mortar; masala = mortar (Mundari.lex.) tagar = a tub, a bucket, a trough, a platter (P.lex.) d.aka d.ak = a wooden trough used for feeding pigs, watering cattle, and at times for bathing (Santali.lex.) da_gara, d.a_gara. d.a_gara_ = a large flat basket woven of thin bamboo strips in which articles are fried or exposed to the sun (Te.lex.) d.agri_ = winnowing basket (Mth.)(CDIAL 5522). d.haki = a large basket (Santali.lex.) [Rebus: 'trough' in front of animals]. **d.a_gara, d.a_gara_** = a large winnowing basket; a large square tray of bamboo splints (Te.lex.) **tavaya** = frying pan (Pkt.); **tawa** = griddle (K.); taula_ large earthen cooking vessel (Bi.Mth.); **tavali_** metal or earthen vessel (M.)(CDIAL 5670). Yet another re-affirmation: **d.a_n:gra_** = a wooden trough just enough to feed one animal. cf. **id.ankar..i** = a measure of capacity, 20 id.an:kar...i make a par-r-a (Ma.lex.) d.aNga_ = small country boat, dug-out canoe (Or.); d.o~ga_ trough, canoe, ladle (H.)(CDIAL 5568).

Glyph : **tagad.o** = [Skt. trika a group of three] the figure three (3)(G.lex.) [Note. Three persons shown next to a tree on a tablet].

Glyph: **tagara** = ram (Te.lex.); takaram (Ta.lex.); t.agaru, t.agara, t.igaru, tagar = a ram (Ka.); tagara, tan:gad.i_ (H.M.); **tagade_ra, tagate_ra** = having a ram for his vehicle: fire (Ka.)(Ka.lex.) Old Tamil: **takar** 1. sheep; 2. ram; 3. goat; 4. aries in the zodiac; 5. male ya_r..i 6. male elephant; 7. male shark. **t.agarudaleya, t.agarutaleya** = daks.abrahmanu, Daks.a, the son of Brahma_, father of Durga_ and father-in-law of S'iva, who on one occasion celebrated a great sacrifice to obtain a son, but omitted to invite S'iva, wherefore S'iva interrupted the sacrifice, and by his incarnation Vi_rabhadra had Daks.a decapitated; for the decapitated head that of a ram was substituted (Ka.lex.) 4080.<u>Images: ram; male elephant; male shark</u>: takar sheep, ram, goat, male of certain other animals (porutakar ta_kkar-ku-p- pe_run takaittu : Kural.486); male elephant; male shark (Ta.lex.) (ya_l.i, elephant, shark)(Ta.); takaran huge, powerful as a man, bear, etc. (Ma.); tagar, t.agaru, t.agara, t.egaru ram (Ka.) tagaru, t.agaru id. (Tu.); tagaramu, tagaru id. (Te.); tagar id. (M.)(DEDR 3000). tan:gad.i_, tagara a ram (M.H.); tagade_ra having a ram for his vehicle: fire; tagarven.agisu to cause rams to fight (Ka.lex.) da_dlo bokro ram (Kon.lex.) [cf. kara_ male alligator; kar.e_n.u elephant (Ta.lex.)]

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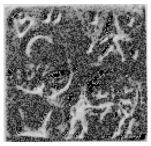
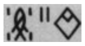
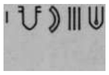
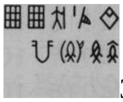
Rebus: **tagara, tavara** [Tbh. of *tamara* or *trapu*] tin (Ka.Te.Ta.M.)(Ka.lex.) takaram tin, white lead, metal sheet, coated with tin (Ta.); tin, tinned iron plate (Ma.); tagarm tin (Ko.); tagara, tamara, tavara id. (Ka.) tamaru, tamara, tavara id. (Ta.): tagaramu, tamaramu, tavaramu id. (Te.); t.agromi tin metal, alloy (Kuwi); tamara id. (Skt.)(DEDR 3001). trapu tin (AV.); tipu (Pali); tau, taua lead (Pkt.); tu~_ tin (P.); t.au zinc, pewter (Or.); taru_aum lead (OG.); tarvu~ (G.); tumba lead (Si.)(CDIAL 5992).

 Kalibangan033  8025 m0527Bt  3336
m0573Bt 3415

dha_tu ‘mineral’ (Vedic); **dhatu** a mineral, a metal (Santali); *dha_ta* id. (G.) ta_tu = powder (Ta.)(DEDR 3159) Possibly cassiterite? **tan.t.ava_l.am** = cast iron, iron rail, girder (Ta.); tan.d.ava_l.a cast iron (Ka.)(DEDR 3050). **dad.ko, dad.o** a lump; **dad.ba** a lump of earth, a clod (G.) **da_ntar-kut.ha** = fireplace (Sv.)(CDIAL 3546)

da~tela a large wild boar with huge tusks (Santali)

Smithy, ***pasra***

pasra = a smithy, a place where a blacksmith works; to do a blacksmith’s work; *kamar pasrat.hene sen akantalea* = our man has gone to the smithy; pasrao lagao (or ehop) akata = he (the blacksmith) has started his work (Santali); **pasra** (Mundari)(Santali.lex.Bodding) **pasra, pasa_ra** (Sad.; Or. **pasra_,** a blacksmith’s implements) = a blacksmith’s forge; the place where a brazier (t.ent.era, malar.a) makes his bowls, armlets; ne pa_l t.apuakana pasarate idiime = this ploughshare is blunt, take it to the smithy; the set of a blacksmith working in his forge; **pasra o** = of the blacksmith’s work in the forge; pa nasra = the length of a blacksmith’s work n the forge; **pasraili** = rice beer offered for sale; **pasra mer.ed, pasa_ra mer.ed** = syn. of **kot.e mer.ed** = forged iron, in contrast to **dul mer.ed**, cast iron (Mundari.lex.) **pan~ja_va_, pa~ja_va_** = brick kiln (P.); pa~_ja_ kiln (B.); paja_vo (G.)(CDIAL 7686). **paya_n** = potter’s kiln (B.)(CDIAL 8023). paja_vo = a kiln; cf. paca_vavum, to digest in the stomach (G.lex.) **pa_car-ai** = pa_t.i vi_t.u, i.e. town house or army house (Pur-ana_.)

prasta_ra = a process in preparing minerals (Skt.); prastara = anything strewn, grass to sit on (RV); rock, stone (Skt.); pa_thar = stone (Ku.A.b.); patthal = hailstone (Bi.)(CDIAL 8857). pathraut.i_ = clay mixed with fine gravel (Bi.)(CDIAL 8861). pasa_re, pasa_ra = a grocer’s shop (Ka.Te.); **pasarike, pasara** = articles of a shop (Ka.lex.)

pa_s'o = a silver ingot; pa_s'a_ta_n.iyo = one who draws silver into a wire (G.) **pa_slo** = a nugget of gold or silver having the form of a die (G.)

pasaramu, pasalamu = an animal, a beast, a brute, quadruped (Te.lex.) Thus, the depiction of animals in epigraphs is related to smithy, **pasra.**

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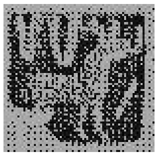
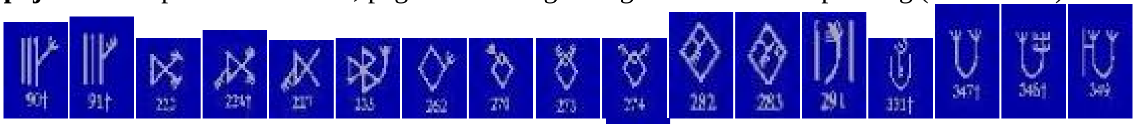


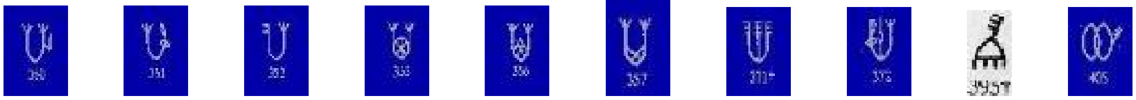
On this seal: a slanted linear stroke is depicted fronting a deer: Pict-49 Uncertain animal with dotted circles on its body. The depiction of dotted circles on a small deer pisera_ could represent a bead workshop
: **pot** 'bead' + **pasra** 'smithy'

pisera_ = a small deer brown above and black below (H.)(CDIAL 8365). pr.s.ata = spotted; spotted deer (VS.); pr.s.ita = spotted (n. 'rain' Gobh.); pr.s.at = spotted (AV); spotted antelope (R.); pasata-miga = spotted deer (Pali); pasaya = a kind of deer (Pkt.); pusia id. (Pkt.)(CDIAL 8364). paha_ru (P.); pa_hr.a_ = stag (P.) pa_ri_ (G.), paha_r, paha_ray (M.) Spotted antelope **pa_r.ho** hogdeer or cervus porcinus (S.); pa_hr.a_ (L.); pa_r.ha_ = spotted antelope, hogdeer (P.H.) pr.s.ata = spotted deer (VS.)

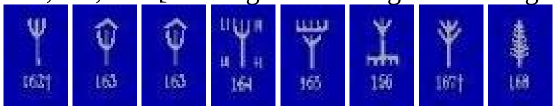
panje, panjho = the hand opened out; a claw, a paw; the five on a dice in play; *pasli_* the hollow of the hand (G.) pan~jali = with outstretched hands, as token of reverence (Skt. pra_n~jali)(Pali.lex.) pan~ja_ = the paw, the palm; the image of a hand worshipped and taken in procession during the Mohurrum festival (Te.lex.)

pajhar. = to sprout from a root; pagra = a cutting of sugar-cane used for planting (Santali.lex.)

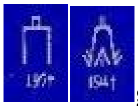




Signs 90,91,223,224,227,235.262,270,273,274,282,283,291,331,347-352,355-357, 371,372, 388-390,395,405 [With ligatures of Sign 162 or Sign 169]

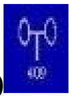


Signs 162 to 168 [Orthography: sprout]. As a countable object, the sign represents the rebus of (number of) [brick] kilns, the number (count) being indicated by short linear strokes.



gat.a = a small stream or water course (Santali) gat.t.u = a shore, a bank; a dam, embankment, dike (Te.) kat.t.a_ platform (Kol.); kat.t.a bund of field, dam, dike (Nk.)(DEDR 1147).

Rebus: Ingot: **gat.t.i ban:ga_ru** = gold in ingots or bars (Te.) kat.t.i = clod, lump (Ta.); solid, ingot (Ma.); kat.y solid lump (Ko.); gad.d.a = lump, mass, clod (Te.)(DEDR 1148). kad.rna_ to congteal (Kur.); kat.hina hard, firm (Skt.)(CDIAL 2650). kat.hara, kat.hura, kat.hora hard (CDIAL 2651) kad.d. to be hard, severe (DhP.)(CDIAL 2657). gat.i = nodular limestone; gat.i cun = lime made from nodular limestone (Santali)

Sign 409 (26)  glyph: cart**: gad.i** 'cart' (Santali)

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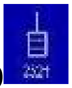
Sign 121 (70) Glyph: twelve fingers' measure = **s'an:ku** (IL 2878), co~ga_ = two hand-breadths (IL 3121)

Rebus: **s'ankha** = turbinella pyrum, conch shell (Skt.)

Liquid measure is depicted by Sign 252: **ran:ku**; rebus: **ran:ku** = tin (Santali) **Sign 252 (51)** Copper tablet (11); bronze implements (2) 'Tree' Field symbol 44 (7)

ra~_go buffalo bull (Ku.N.)(CDIAL 10559). ra~_kat. big and boorish (M.)(CDIAL 10538). cf. ran:ka slow, dull (Skt.)(CDIAL 10538). ron:ke, ran:ke the grunt of a wild buffalo (Ka.lex.)

ran:ga ran:gi = fiercely quarrelling or disputing fiercely (Santali)

rakha = a secret term for three (G.lex.) [Three long linear strokes is a recurrent motif in inscriptions of the civilization and appear in contexts where the 'sign' should be read not as a numeral but as 'rakha', tin or made of tin + copper, i.e .bronze].

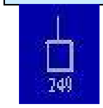
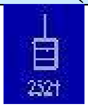
r-an:ku, ran:ku = fornication, adultery (Te.lex.)

A bull mating with a cow. Seal impression (BM 123059). From an antique dealer in Baghdad. Cf. Gadd 1932: no. 18.

ran:ga, ran: pewter is an alloy of tin lead and antimony (an~jana) (Santali). **ran:ku** 'tin' (Santali) Tin, solder: ran:ga tin (Skt.); ram.ga (Pkt.); ra~_g pewter, tin (P.H.); ra~_ga_ pewter, tin (P.H.); solder (Or.Bi.Mth.); ra_n. tin, solder (Ku.N.A.B.); ra~_k (Ku.); ra_n.o (N.); ra_n:ga tin (Or.); ra_n:ga_ solder (Or.); ra_m.ga (OAw.); ranga tin (Si.)(CDIAL 10562). ra_n.(g)ta_ tinsel, copper-foil (B.)(CDIAL 10567). [cf. ren. cement for metallic objects (G.); ren.i_ ingot (L.)(CDIAL 10639).] **ran: t.odor** a wristlet of pewter (Santali.lex.) ran:ga = tin; splendour, brilliance, glow and glitter (Ka.lex.) ran:garincu = to mix or rub with the finger, as any liquid and a solid or semi-solid substance (Te.lex.)

ran:ga, ran:gada borax (Skt.); run. saline ground with white efflorescence, salt in earth (Kho.)(CDIAL 10563). run:got solution of saline earth (Kho.)(CDIAL 10573).

rakamu = an item or article (of an account); an amount of money; an appointed quantity; a piece (Ka.M.H.); rakamu va_ru = article by article, piece by piece (Ka.M.H.)(Ka.lex.) rakam (Arabic rakm) an item; an article; a sum, an amount, a number (G.lex.) rakam upa_d.vi_ to borrow a sum of money; rakam na_me lakhvi_ to sell on credit a sum of money or an article of value, and enter it in the account-book (G.lex.)

  **ran:ku** 'liquid measure (Mundari)

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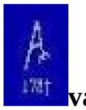
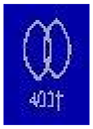
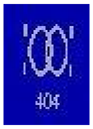
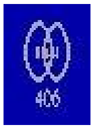
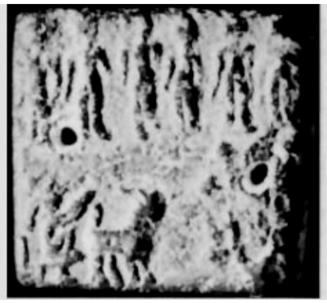
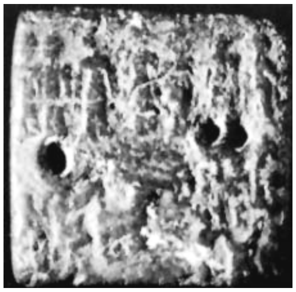
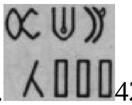
Glyph: **va_holo** = adze; vahola_ = mattock;   bahola_ = a kind of adze (P.lex.)
See **bahula_** ‘pleiades’ (Skt.)

Rebus: **ban:gala** = kumpat.i = an:ga_ra s’akat.i_ = a chafing dish, a portable stove, a goldsmith’s portable furnace (Te.lex.) cf. ban:garu, ban:garamu = gold (Te.lex.)

   V403**ban:gad.i_** a bangle, a bracelet of glass, gold, or other material, worn on the wrist by women (G.lex.) bhagan.a = a bangle (IA 19)(IEG) **ban:gan** = bangle (cf. Ka_li_ban:gan, black bangle: name of a site on River Sarasvati banks)

 m0442At  m0442Bt h097
Pict-95: Seven robed figures (with stylized twigs on their head and pig-tails) standing in a row. 4251

bahula_ = Pleiades (Skt.) **bagal.a_** = name of a certain godess (Te.lex.) bagal.a_, bagal.e, vagala_ (Ka.); bakala_, bagal.a_, vagal.a_ (Te.); bagal.a_devi = one of the s’akti deities by means of which one may shut the mouth of an opponent, etc. (Ka.lex.) bakkula = a demon, uttering horrible cries, a form assumed by the Yakkha Ajakala_paka, tto terrify the Buddha (Pali.lex.) bahula_ pl. the Pleiades (VarBr.S.); bahulika_ pl. (Skt.); bahul (Kal.); ba_l, baul, balh (Kho.); bol, boul, bolh (Kho.); bale (Sh.)(CDIAL 9195). bahulegal. = the Pleiades or Kr.ittika_-s (Ka.lex.) **bahula_** (VarBr.S.); bahul (Kal.) six presiding female deities: vahula_ the six presiding female deities of the Pleiades (Skt.); va_kulai id. (Ta.)(Ta.lex.) 5719.Image: pleiades: bahulika_ pl. pleiades; bahula born under the pleiades; the pleiades (Skt.lex.) bahule, bahulegal. the pleiades or kr.ttika_s (Ka.)(Ka.lex.) Image: female deities of the pleiades: va_kulai < vahula_ the six presiding female deities of the Pleiades; va_kule_yan- < va_kule_ya Skanda (Ta.lex.) pa_kulam < ba_hula the month of Ka_rttikai = November-December; pa_kul.i full moon in the month of purat.t.a_ci (Vina_yakapu. 37,81)(Ta.lex.) ba_hule_ya Ka_rttike_ya, son of S'iva; ba_hula the month ka_rttika (Skt.Ka.)(Ka.lex.)

bagalo = an Arabian merchant vessel (G.lex.) bagala = an Arab boat of a particular description (Ka.); bagala_ (M.); bagarige, bagarage = a kind of vessel (Ka.)(Ka.lex.)

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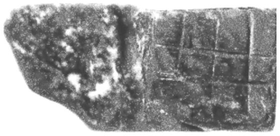
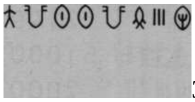
Rebus: **ban:gala** = a portable stove (Te.) **bat.a** = quail (Santali); rebus: **bat.hi**, **bat.a** = smelting furnace (Te.) **kuduru** = lizard (Kuwi); rebus: **kuduru** = portable gold furnace (Te.) **bed.a hako** = fish (Santali); **bed.a** = hearth (G.)

m1349A  m1349B [The epigraph may contain a 'partitioned rectangle' glyph]

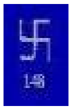
m1429At m1429Bt Pict-125: Boat.

m1429Ct  3246 Gharial (or lizard) holding a fish in its jaws.

m1406At m1406Bcolour 2827 Pict-102: Drummer and people vaulting over? An adorant? Substantive: *bharatiyo* a caster of metals (G.); glyph: *bharad.o* a devotee of S'iva (G.) **kamsa kamsi** = jump (Santali.lex.) **kam.sa** = bronze (Te.lex.)

Blurred distinctions between 'pictorials' and 'signs'

The distinction between pictorial motifs and signs gets blurred in many compositions presented in the script inscriptions.



Thus, a svastika appears together with an elephant or a tiger.The 'svastika' is a pictorial and also a sign

Sign 148 Glyph: **sathiya_** (Pkt.); rebus: **satva** 'zinc' (Ka.) Elephant: **ib**; rebus: **ib** 'iron'; Tiger: **kol**; rebus: **kol** '*pan~caloha* alloy of metals'.

m1186AComposition: horned person with a pigtail standing between the branches of a pipal tree; a low pedestal with offerings (? or human head?); a horned person kneeling in adoration; a ram with short tail and curling horns; a row of seven robed figures, with twigs on their pigtails.

samr.obica, stones containing gold (Mundari.lex.) cf. *soma* (R.gveda) **samanom** = an obsolete name for gold (Santali).

saman: = to offer an offering, to place in front of; front, to front or face (Santali) [Note the glyph of short-horned bulls facing each other.]

bali = iron stone sand (Santali) **bal** = to bore a hole, or to puncture, with a red ho iron (Santali) [Note: the dotted circle may denote rebus: **bali** 'iron stone sand'.]

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era = a bait; food; a victim for sacrifice (Te.lex.) [Note. A bait (?) placed on a low stool as an offering on a glyptic representation of offering].[xv]

er-agu = a bow, an obeisance; er-aguha = bowing, coming down (Ka.lex.) er-agisu = to bow, to be bent; to make obeisance to; to crouch; to come down; to alight (Ka.lex.) cf. arghas = respectful reception of a guest (by the offering of rice, du_rva grass, flowers or often only of water)(S'Br.14)(Skt.lex.) erugu = to bow, to salute or make obeisance (Te.)

erka = ekke (Tbh. of arka) aka (Tbh. of arka) copper (metal); crystal (Ka.lex.) cf. eruvai = copper (Ta.lex.) eraka, er-aka = any metal infusion (Ka.Tu.) **eruvai** 'copper' (Ta.); **ere** dark red (Ka.)(DEDR 446).

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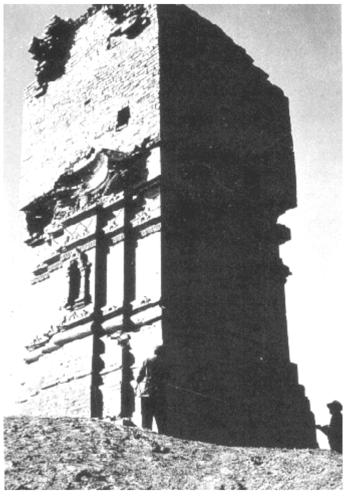
River Sarasvati: Archaeology, Culture and Heritage Tourism

The course of the River Sarasvati extends from the Himalayan glaciers through Rajasthan to Gujarat through a variety of ecological zones—Himalayan snows, mountainous terrain (challenging the mountaineers and trekkers), mighty rivers (some stretches navigable), vast lakes with boating facilities, fertile alluvial plains, semi arid lands, salty marshes. Eco-tourism can be promoted in the glacial sources and along the variety of watershed management projects ongoing and proposed to ensure the equitable distribution of water from the glacier sources and integrated development of surface, sub-surface and groundwater resources and water harvesting projects. The river basin is thus a rich source for developmental tourism for scientists, development professionals and students while we celebrate a_pah as the sacred waters in the time honoured traditions of the country.

The tasks of relating archaeology to culture and promotion of heritage tourism on the historical sites of River Sarasvati are an inter-disciplinary endeavour involving arcaeology, water resources management, development of cultural projects and tourism.

Saravati Civilization: Locus and Survey of research work done so far



Pattan Minara, Hindu Temple on the banks of Sarasvati River (c. 5th cent. CE?). (Brick decorated). (After Mughal, 1997, Pl. 22)

Binjadasar. A temple in ruins. On the banks of the Sarasvati River. (After Bapat, V.D., and Umapathy, K.R. (tr.), 1994, *Lost' River Sarasvati, Mysore*, Bharatiya Itihasa Sankalana Samithi (tr. from Vakankar, L.S. and Paracure, C.N., 1992, Lupta Sarasvati_ Nadi_ s'odh (Marathi).

R.gveda refers to the burning of sacrificial fires (yajn~as) on the banks of Sarasvati_ and Dr.s.advati_ Rivers (RV. 3.23.4). The satras conduced by r.s.is on the banks of the Sarasvati_ river are mentioned in the Aitareya Bra_hman.a (2.18). A Sa_rasvata yajn~a was organized in Yamuna_ti_rtha of Sarasvati_ (MBh. Vana. 128.14); Bakada_lbhya performed an abhica_ra yajn~a in a jala-kun~ja of Sarasvati_ (MBh. S'alya 40.18); Ekata, Dvita and Trita came to Sarasvati_ to observe a yajn~a (MBh. S'alya 35.24); the holy places on the banks of Sarasvati_ referred to are:

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San:khati_rtha (MBh. S'alya 36.20), A_dityati_rtha (MBh. S'alya 49.23), Sarasvatati_rtha (MBh. S'alya 50.2) and Saptasa_rasvatati_rtha (MBh. S'alya 39.6).

The following excerpt from *History Of the Dakshinatya Sarasvats Sarasvat Vol. 1 No. 1 The Origin and Spread of Gauda Sarasvats* is a logical followup of the discoveries which date back our bronze age civilization to c. 3500 BCE.*:*

*"A*ccording to *Skandapura_n.a* (*Sahyadri Khan.d.a, Uttara_rdha* 1-3), the brahmins that lived in the North of the Vindhyas were called Gauda brahmins and those from the South the Dravidas. Each group was divided into five sections according to the regions of their settlement. The five (Pancha) Gauda brahmin groups were: the Sarasvats (from the banks of the Sarasvathi river), Kaanyakubjas (from Kanauj), Gaudas (from the banks of the South Ganga or Bengal), Utkals (from Orissa) and the Maithilas (from Mithila in Bihar). The five (pancha) Dravida groups were: the Maharashtras, Andhras, Dravidas (from Tamilnadu), Karnata (from Karnataka) and the Gurjaras (from Gujarat)."

The Croats (of erstwhile Yugoslavia) claim that they are Sarasvats! The Behistun (Iran) inscription of Darius does refer to the region called Hravat (Haraquaiti) which is a phonetic transform from Sarasvati. Sarasvati—Haraquaiti—Hravat-Kravat-Croat! They have a website cross-linked with the sarasvati URL (http://sarasvati.simplenet.com). The naming of rivers as Sarasvati in the Little Rann of Kutch and in the Pus.kar are consistent with the naming of a tributary of Helmand as Haraquaiti.

Thus the name of Haraqauti is simply explained as a memory carried by the people as they migrated out of the Sarasvati River Basin from Northwestern India as the river started to desiccate for the geomorphological and tectonic reasons explained elsewhere.

It is significant that Sangam literature of the Tamils notes the claim of the ancient Chera kings that they were the 42nd generation descendants from the rulers of Dwaraka (Tuvarai) and the sage Agastya is revered as the ancient Tamil Muni and the author of the earliest grammatical work in Tamil. Sangam literature is replete with references to the support provided to the growth of Vedic Culture in the Tamil-speaking areas. An important article on the antiquity of relation between Tamil and Sanskrit is: Sharma, K.V. 1983.

"Spread of Vedic culture in ancient south India*"* *Adyar Library Bulletin* 47:1-1**.** "Among the interesting facts that emerge from a study of the progressive spread of vedic culture from the North-West to the other parts of India, is its infusion, with noticeable intensity, in the extreme south of India where, unlike in other parts, a well-developed Dravidian culture was already in vogue… *Tolka_ppiyam* which is the earliest available work of the sangam classics, is a technical text in 1610 aphorisms, divided into three sections, dealing respectively, with phonetics, grammar and poetics… The other available sangam works are three sets of collected poems, being, *pattu-ppa_t.t.u* (Ten idylls), *et.t.u-ttokai* (Eight collections) and *patineki_r..kan.akku* (eighteen secondary texts), which last appears to pertain to the late period of the saµgam age. The ten poems are: *tirumuruka_r.r.uppat.ai, porun.ara_r.r.u-ppat.ai, cir.upa_n.a_r.r.uppat.ai, perumpa_n.a_r.r.uppat.ai, mullaippa_t.t.u, maturaikka_n~ci, net.unelva_t.ai, kuriñcippa_t.t.u, pat.t.inappa_lai* and *malaipat.ukat.a_m*. All the above idylls are compositions of individual poets, and, except for the first, which is devotional and possibly, pertains to late sangam age, are centred round the royal courts of the Cera, Cola and Pa_n.d.ya kings, depicting the contemporary elite scholarly society and youthful life. The second category consists of Eight collections: *nar.r.in.ai, kur.untokai, ainkur.unu_r.u, patir.r.ujppattu, paripa_t.al, kali-ttokai, akana_n-u_r.u* and *pur.ana_n-*

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u_r.u. All these collections are highly poetic and self-contained stray verses of different poets put together in consideration of their contents. The third category consists of eighteen miscellaneous texts, some of them being collections of stray verses of different poets and some composed by individual authors. They are: *tirukkur.al., na_lat.iya_r, par..amor..i, tirikat.ukam, na_n-man.ikkat.ikai, cir.upañcamu_lam, ela_ti, a_ca_rako_vai, mutumor..i-kka_ñci, kalavar..i-na_r.patu, initu-na_r.patu, tin.aima_lainu_r.r.aimpatu, aintin.ai-y-er..upatu, kainnilai, aintin.ai-yanpatu, tin.aimor..i-y-aimpatu* and *ka_r.-na_r.patu*. The verses in these works also refer to social customs and local sovereigns. The above works picture a well-knit and well-developed society having a distinct identity of its own. The frequent mention, in sangam poems, of the Cera, Cola and Pa_n.d.ya kings as the munificent patrons of the poets… and the archaeological evidence provided by 76 rock inscriptions in Tamil-Bra_hmi script which corrobate the contents of the sangam works, in 26 sites in Tamilnadu (Mahadevan, I., Tamil Bra_hmi inscriptions of the Sangam age, *Proc. Second International Conference Seminar of Tamil Studies*, I, Madras, 1971, pp. 73-106) help to fix the date of the classical sangam classics in their present form to between 100 B.C. and 250 A.D… reference to the Pa_n.d.yan kingdom by Megasthenes, Greek ambassador to the court of Candragupta Maurya (c. 324-300 B.C.?) are also in point. On these and allied grounds, the sangam period of Tamil literature might be taken to have extended from about the 5th century B.C. to the 3rd century A.D… It is highly interesting that sangam literature is replete with references to the vedas and different facets of vedic literature and culture, pointing to considerable appreciation, and literary, linguistic and cultural fusion of vedic-sanskrit culture of the north with the social and religious pattern of life in south India when the sangam classics were in the making… The vedas and their preservers, the bra_hmans, are frequently referred to with reverence (*Pur.ana_n u_r.u* 6, 15 and 166; *Maturaikka_ñci* 468; *tirukat.ukam* 70, *na_n-man.ikkat.ikai* 89, *initu-na_r.patu* 8). The vedic mantra is stated as the exalted expressions of great sages (*Tolka_ppiyam*, Porul. 166, 176). While the great God S'iva is referred as the source of the four vedas (*Pur.a.* 166), it is added that the twice-born (bra_hman) learnt the four vedas and the six veda_ngas in the course of 48 *years (Tiru-muruka_r.r.uppat.ai*, 179-82). The vedas were not written down but were handed down by word of mouth from teacher to pupil (*Kur-untokai* 156), and so was called kel.vi (lit. what is heard, šruti)(*Patir.r.ippattu* 64.4-5; 70.18-19; 74, 1-2; *Pur.a.* 361. 3-4). The bra_hmans realized God through *the vedas (Paripa_t.al 9. 12-13) and recited loftily in vedic schools (Maturaikka_ñci* 468-76; 656)… the danger to the world if the bra_hman discontinued the study of the veda is stressed in *tirukkur.al.* 560. If the sangam classics are any criteria, the knowledge and practice of vedic sacrifices were very much in vogue in early south India. The sacrifices were performed by bra_hmans strictly according to the injunctions of the vedic mantras (*tirumuruka_r.r.uppat.ai* 94-96; *kalittokai* 36). The three sacred fires (*ga_rhapatya*, *a_havani_ya* and *daks.ina_gni*) were fed at dawn and dusk by bràhmans in order to propitiate the gods (*Kalittokai* 119l *Pur.a.* 2; 99; 122; *Kur.iñcippa_t.t.u* 225). *Paripa_t.al* 2. 60-70 stipulates, in line with vedic sacrificial texts, that each sacrifice had a specific presiding deity, that pas'us (sacrificial animals) were required for the sacrifice and that the sacrificial fire rose to a great height. The vedic practice of placing a tortoise at the bottom of the sacrificial pit is referred to in Akana_n-u_r.u 361… *Patir.r.uppattu* 64 and 70 glorify the Cera king Celvakkat.unkovar..iya_tan- who propitiated the gods through a sacrifice performed by learned vedic scholars and distributed profuse wealth amongst them. Another Cera king, Perum-ceral Irumpor.ai is indicated in Patir.r.uppattu 74 to have performed the Putraka_mes.t.hi_ sacrifice for the birth of his son il.amceral irumpor.ai. The Cola ruler Peru-nar.kil.l.i was renowned as Ra_jasu_yam ve_t.t.a co_r..an- for his having performed the ra_jasa_ya sacrifice; another Cola ruler Nar.kil.l.i, too, was celebrated as a sacrificer (*Pur.a.* 363; 400). The Cola kings were also considered to have descended from the north Indian king S'ibi the munificent of *Maha_bha_rata* fame (*Pur.a.* 39; 43). The patronage accorded to vedic studies and sacrifices is

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illustrated also by the descriptive mention, in *Pur.a.* 166, of a great vedic scholar Vin.n.anta_yan- of the Kaun.d.inya-gotra who lived at Pu_ñja_r.r.u_r in the Co_r..a realm under royal patronage. It is stated that Vin.n.anta_yan- had mastered the four vedas and six veda_ngas, denounced non-vedic schools, and performed the seven pa_kayajñas, seven ***Soma***-yajñas and seven havir-yajñas as prescribed in vedic texts. The Pa_n.d.yan kings equalled the Colas in the promotion of Vedic studies and rituals. One of the greatest of Pa_n.d.ya rulers, Mudukut.umi Peruvar..uti is described to have carefully collected the sacrificial materials prescribed in vedic and dharmašàstra texts and performed several sacrifices and also set up sacrificial posts where the sacrifices were performed (*Pur.a.* 2; 15). *Maturaikka_ñci* (759-63) mentions him with the appellation pal-s'a_lai (pal-ya_ga-s'a_lai of later Ve_l.vikkud.i and other inscriptions), 'one who set up several sacrificial halls'. The Pa_n.d.ya rulers prided themselves as to have descended from the Pa_n.d.avas, the heroes of Maha_bha_rata (*Pur.a.* 3; 58; *Akana_n-u_r.u* 70; 342)… God Brahmà is mentioned to have arisen, in the beginning of creation, with four faces, from the lotus navel of God Vis.n.u (*Paripa_t.al* 8.3; *Kalittokai* 2; *Perumpa_n.a_r.r.uppat.ai* 402-04; *Tiru muruk a_r.r.up pat.ai* 164-65; *Iniyavai-na_rpatu* 1). It is also stated that Brahma_ had the swan as vehicle (*Innà-nàrpatu* 1). Vis.n.u is profusely referred to. He is the lord of the Mullai region (Tol. Akattin.ai 5) and encompasses all the Trinity (*Paripa_t.al* 13.37). He is blue-eyed (Pur.a. 174), lotus-eyed (*Paripa_t.al* 15.49), yellow-clothed (*Paripa_t.al* 13.1-2), holds the conch and the discus in his two hands and bears goddess Laks.mì on his breast (*Mullaippa_t.t.*u 1-3; *Perumpa_n.* 29-30; *Kali.* 104; 105; 145), was born under the asterism Tiru-o_n.am (*Maturai*. 591), and Garud.a-bannered (*Pur.a.* 56.6; *Paripa_t.al* 13.4). Of Vis.n.uite episodes are mentioned his measuring the earth in three steps (*Kali.* 124.1), protecting his devotee Prahla_da by killing his father (*Pari.* 4. 12-21) and destroying the demon Kes'in (*Kali.* 103.53-55). S'iva has been one of the most popular vedic-pura_n.ic gods of the South. According to *Akana_n-u_r.u* 360.6, S'iva and Vis.n.u are the greatest gods. He is three-eyed (*Pur.a.* 6.18; *Kali.* 2.4), wears a crescent moon on his forehead (*Pur.a.* 91.5; *Kali.* 103.15), and holds the axe as weapon (*Aka.* 220.5; *Pur.a.* 56.2). He bears river Ganga_ in his locks (*Kali.* 38.1; 150.9) and is blue-necked (*Pur.a.* 91.6; *Kali.* 142). He is born under the asterism *a_tirai* (Skt. *àrdra*) (Kali. 150.20), has the bull for his vehicle (*Paripa_t.al* 8.2) and is seated under the banyan tree (*Aka.* 181). Once, while sitting in Kaila_sa with Uma_ (Pa_rvati), his consort (*Pari.* 5.27-28; *Par..amor..i* 124), Ra_van.a, the ra_ks.asa king shook the Kaila_sa and S'iva pressed the mountain down with his toe, crushing Ra_van.a and making him cry for mercy (*Kali.* 38). When the demon Tripura infested the gods, S'iva shot through the enemy cities with a single arrow and saved the gods (*Kali.* 2; Pur.a. 55; Paripa_t.al 5. 22-28). *Pur.ana_n –u_r.u* (6. 16-17) refers also to S'iva temples in the land and devotees walking round the temple in worship. God Skanda finds very prominent mention in saµgam classics, but as coalesced with the local deity Murukan-, with most of the pura_n.ic details of his birth and exploits against demons incorporated into the local tradition (*Paripa_t.al* 5. 26-70; *Tirumuruka_r.r.uppat.ai*, the whole work). Mention is also made of Indra. (Balara_ma) is mentioned as the elder brother of Lord Kr.s.n.a, as fair in colour, wearing blue clothes, having the palmyra tree as his emblem and holding the ;lough as his weapon, all in line with the pura_n.as (*Paripa_t.al* 2. 20-23; *Pur.a.* 56. 3-4; 58.14; *Kali.* 104, 7-8). *Tolka_ppiyam* (Akattin.ai iyal 5) divides the entire Tamil country into five, namely, Mullai (jungle) with Vis.n.u as its presiding deity, Kur.iñji (hilly) with Murukan- as deity, Marutam (plains: cf. marusthali_ Skt.) with Indra as deity, Neytal (seashore) with Varun.a as deity and Pa_lai (wasteland) with Kor.r.avai (Durga_) as deity… The sangam works are replete with references to the four castes into which the society was divided, namely, bra_hman.a, ks.atriya, vais'ya, and su_dra… bra_hman antan.a primarily concerned with books (*Tol. Mara.* 71), the ks.atriya (***a-ras'a, ra_ja***) with the administration (*Tol. Mara.* 78) and s'u_dra with cultivation (*Tol. Mara.* 81)… It is also stated that marriage before the sacred fire was prescribed only for the first three castes; but the author adds that the custom was

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adopted by the fourth caste also in due course (*Tol. Kar.piyal* 3)… one cannot fail to identify in sangam poetry the solid substratum of the distinct style, vocabulary and versification, on the one hand, and the equally distinct subject-matter, social setting and cultural traits, on the other, both of the Tamil genius and of vedic poetry. As far as the grammar of Dravidian is concerned, a detailed analytical study of Old Tamil as represented in *Tolka_ppiyam*, with the vedic s'iks.a_s and pra_tis'a_khyas, has shown that, 'Tolka_ppiyan-a_r clearly realized that Tamil was not related to Sanskrit either morphologically or genealogically… that he deftly exploited the ideas contained in the earlier grammatical literature, particularly in those works which dealt with vedic etymology, without doing the least violence to the genius of the Tamil language'. (Sastri, P.S.S., *History of Grammatical Theories in Tamil and their relation to the Grammatical literature in Sanskrit*, Madras, 1934, p. 231)… It would be clear from the foregoing that during the sangam age there had already been intensive infusion of vedic culture in south India… Both the cultures coexisted, the additions often affecting only the upper layers of society… For novel names, concepts and ideas, the Sanskrit names were used as such, with minor changes to suit the Tamil alphabet (e.g. akin-i for agni, vaicikan- for vais'ya, veta for veda, or translated (e.g. pa_pa_n- for dars'aka, ke_l.vi for s'ruti). When, however, the concept already existted, in some form or other, the same word was used with extended sense (e.g. ve_l.vi for ya_ga; ma_l or ma_yan- for Vis.n.u). Sometimes both the new vedic and extant Tamil words were used (e.g. ti_ for agni)… It is, however, important to note that the coming together of the two cultures, vedic and dravidian, was smooth, non-agressive and appreciative, as vouched for by the unobtrusive but pervasive presence of vedicism in the sangam works. The advent of vedic culture into South India was, thus, a case of supplementation and not supplantation… it is a moot question as to when vedic culture first began to have its impact on dravidian culture which already existed in south India… the age of this spread (of vedic culture) has to be much earlier than the times of the Ra_ma_yan.a and Maha_bha_rata, both of which speak of vedic sages and vedic practices prevailing in the sub-continent. Literary and other traditions preserved both in north and south India attest to the part played by sage Agastya and Paras'ura_ma in carrying vedic culture to the south. On the basis of analytical studies of these traditions the identification of geographical situations and a survey of the large number of Agastya temples in the Tamil country, G.S. Ghurye points to the firm establishment of the Agastya cult in South India by the early centuries before the Christian era (Ghurye, G.S., *Indian acculturation: Agastya and Skanda*, Bombay, Popular Prakashan, 1977)… the considerable linguistic assimilation, in dravidian, of material of a pre-classical Sanskrit nature, it would be necessary to date the north-south acculturation in India to much earlier times."

The migrations away from the desiccated Sarasvati River, alluded to earlier explain the distribution of smaller size settlements, for example, in the Ganga-Yamuna doab (OCP, Black and Red ware and PGW ware) and in the regions on the right bank of Sindhu in Baluchistan and Afghanistan. The memory of the Sarasvati River was carried by these migrants; for example, there is a river called Haraquaiti in Afghanistan, and there are the rivers called Sarasvati in Pushkar, Rajasthan and Sarasvati which joins the Little Rann of Kutch in Gujarat. The local traditions in almost all parts of Bharat is that when two rivers join, the san:gamma is called triven.i san:gamam; how can this be? Where is the third river? The answer is simple; the third river is the Sarasvati river which flows underground! That Sarasvati River did flow underground is now established as a groundtruth by earth scientists. In Jaisalmer, the scientists of Bhabha Atomic Research Centre found that the deep water wells (30 m. deep) in Jaisalmer area contained water from the Himalayas flowing through underground channels, called aquifers, and dated to over 8000 years Before Present. Astonishingly, the water table remains the same in deep wells in the Jaisalmer area, even after drawing down the water through the tubewells and even during summer.

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The following lists have been compiled:

A comprehensive list of archaeological sites, mostly on the banks of Vedic River Sarasvati with details of bibliographical references, site sizes in hectare, site location coordinates and the typological classification of the artifacts surveyed/excavated at the sites; and

A comprehensive archaeological and geological bibliography with particular reference to issues related to archaeology, culture, tourism and water resources management for the locations mostly along the river banks, and close to the coastline in Gujarat. A detailed study of the literature related to specific sites listed in the bibliography will help evaluate the selection criteria for detailed exploration and to prioritise the future archaeological survey/excavation work. A remarkable pattern seen from the bibliography is that during the last 15 years there have been a number of scientific investigations from a variety of disciplines attesting to the fact that River Sarasvati is not a myth but is ground truth. The historicity of the *Mahabharata* and Vedic texts is getting reinforced through the investigations of scientists and technologists.

Analysis of Settlement patterns in relation to palaeo-channels

The list of archaeological sites of Sarasvati Civilization has been prepared based on published reports and after the framework provided by Gregory Possehl in the Gazetteer of Sites in his magnum opus: *Indus Age – the Beginnigns.* This is a preliminary list which requires further updates. In a few instances, information needs to be updated with coordinates and the sizes of the identified sites. In particular, the status of excavations, if any, undertaken needs to be highlighted for each site. The updates should provide details of excavation reports, if any, related to the excavations carried out since 1947 at any of these sites. In cases where excavations are completed and/or ongoing, the expeditious publication of excavation reports (if possible, on the internet as has been done by Prof. Meadow and Kenoyer for the recent excavations at Harappa) will be essential, to avoid duplication of effort. The attached bibliography, which has been sought to be made as comprehensive as possible, on archaeology and environmental/ geological/ hydrological aspects, detailing the researches, excavations/surveys carried out so far.

Two remarkable features noticed from the names of sites are: (1) that there are a number of plae names which are repeated in more than one district; and (2) there are only a few place names ending with a *–sar* suffix. The *–sar* suffix is common in many place names recorded on Survey of India topo-sheets and many village names in Census records; this is perhaps due to the fact that the archaeological sites were not close to lakes but were located on the banks of a river system with tributaries and distributaries. The formation of lakes was likely a later geological event as the river Sarasvati started desiccating deprived of the glacier waters fed through tributaries: Sutlej and Yamuna.

The staggering number of sites and site typologies such as Pre-Harappan, Transitional, Soth-Siswal and Post-urban Harappan, located on the banks of River Sarasvati point to the continuous and indigenous evolution of culture in the River Basin. This is further augmented by the surprising finds of Copper Hoard sites overlapping with the Mature Sarasvati Civilization periods. This points to the possibility of the migrations of people away from the Gujarat and Rajasthan Sarasvati Basin towards the upper reaches of the River basin in Punjab, Haryana and Himachal Pradesh and towards the Ganga-Yamuna doab. This dramtic feature of internal migrations exhibited by the site locations

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have to be elaborated further by systematic excavation of the many sites located on the banks of Palaeo-channels.

This pattern of internal migrations is of great cultural and historical significance in determining scientically the roots and evolution of Bha_rati_ya civilization over the last 5 millennia, governed by two cultural streams of **Vedic yajn~a** and **Vedic vrata** which virtually define the entire gamut of regional variations exemplified by the emergence of temples and a_gama in almost all regions of the country.

While there are five very large sites on the Sarasvati River Basin, three larger than either Harappa or Mohenjodaro, it is notable that there are hundreds of very small settlements of less than one ha. in size. The sizes and close clustering of the settlements matches the description of 'gra_ma' in the Vedic texts. Though boats were the major media of transport on the waterways of rivers and the long coastline of the civilization area, wagons were also used as evidenced by terracotta models of carts found at many sites.

Further researches and development projects

Persian Gulf states had used a system of weights similar to the one in use in Sarasvati Civilization attesting to the presence of seafaring merchants from Meluhha.

Cubical weights in graduated sizes. These weights conform to the standard Harappan binary weight system that was used in all of the settlements. The smallest weight in this series is 0.856 grams and the most common weight is approximately 13.7 grams, which is in the 16th ratio. In the large weights the system become a decimal increase where the largest weight is 100 times the weight of the 16th ratio in the binary system. These weights were found in recent excavations at Harappa and may have been used for controlling trade.

The key is to unravel the riverine and maritime nature of the origins of the Sarasvati Civilization. One example is provided by the Amri-Nal typologies in many sites in Gujarat and in Makran regions hugging the shallow coast-lines of the Gulf of Khambat, Gulf of Khambat, Makran coastline and moving towards the Persian Gulf As exemplified by the early contacts with the Mesopitamian civilization and contacts recorded among Mesopotamia, Dilmun, Magan and Meluhha. There are indications that Meluhha of Mesotamian and Akkadian cuneiform texts was coterminus with the Sarasvati Sindhu Civilization. The cultural indicator is the use of turbinella pyrum (s'ankha) which is also recorded in the R.gveda, Atharva Veda and develops into a major industry in Bha_rata extending upto the Gulf of Mannar and the coastal ports of the East Coast. It should be noted that the habitat of *turbinella pyrum* is only in the coastline of Bha_rata and does not occur in any other part of the world. S'ankha (conch shell) is used as a conch trumpet, is used for making bangles, necklaces and other ornaments, it is deemed sacred as part of as.t.aman:gal.a (eight auspicious symbols), used by mothers to feed medicines to children and is used as ladles on auspicious occasions and for performing yajn~as. S'ankha adorns the mu_rtis of Vis.n.u and S'iva in a_gama. Kr.s.n.a is adorned with Pa_n~cajanya used to call the troops to battle and many heroes of the *Mahabharata* have specifically-named conch trumpets made of s'an:kha.

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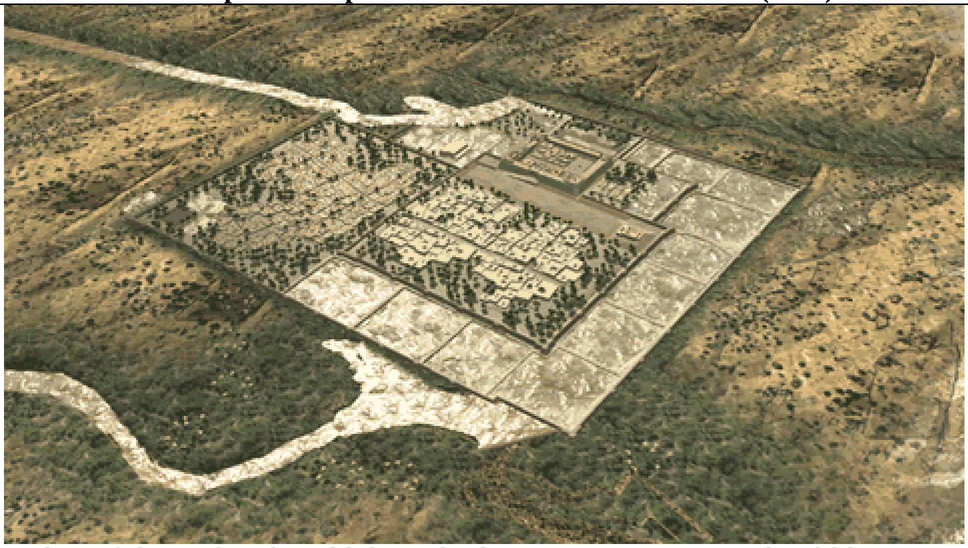
A characteristic feature of the urban realm of Sarasvati Civilization is that the settlements were well planned and created. In settlements such as Lothal, and Kalibangan, mudbrick foundation platforms of massive dimensions were laid out before the settlement was constructed upon them, to ensure that the settlement was well above the level of the flood waters, in the case of settlements on river-banks and well above the level of high waves resulting from sea incursions, in the case of settlements close to the coast. A term 'citadel' is normally applied to such areas of the settlement constructed on a walled mound on a higher elevation. The following list provides the list of such identified citadels.

Settlement	**Estimated size**	**Locus**
Harappa	150 ha	Ravi river
Mohenjodaro	250 ha	Sindhu River
Ganweriwala	80 ha	Sarasvati River
Rakhigarhi	80 ha	Drishadvati River
Dholavira	100 ha	Port, Gulf of Kutch
Sotka Koh	16 ha	Shadi Kaur River, Makran coast
Sutkagen Dor	4.5 ha	Dasht River, Makran coast
Surkotada	1.4 ha	Gulf of Kutch
Balakot	2.8 ha	Coast west of Sindhu
Banawali	16 ha	Sarasvati River
Desalpur	1.3 ha	Gulf of Kutch
Lothal	4.8 ha	Bhogava River, Gulf of Khambat
Kalibangan	11.5 ha	Sarasvati River
Mitathal	7.2 ha	Drishadvati River

The forts on the banks of River Sarasvati and River Sindhu constructed during the historical periods is a continuity of this phenomenon of protecting settlements with *durga* 'forts'.

Computer Graphics Reconstruction of Dholavira (2001)



A view of the entire city with its "Citadel", "Lower Town" and "Middle Town"

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The "Citadel" (left), and the "Lower Town" and "Middle Town" (right)

“The city was surrounded by a series of square walls, with a "Citadel" which rises 15 meters above the "Middle Town" and the "Lower Town". A signboard with ten huge Indus signs found on the floor of a room at the North Gate was probably originally displayed above the gateway. Although the Indus script written on the signboard is still undeciphered, it is likely that the inscription represents the name of the city or the name of a god or a ruler.” [Supervisor for the computer graphics: R. S. Bisht (Archaeological Survey of India) Computer graphics: Osamu Ishizawa, Yasuyo Iwata and Nobuyuki Matsuda (Taisei Corporation) in collaboration with NHK. Photos courtesy: http://bosei.cc.u-tokai.ac.jp/~indus/english/2_4_03.html See Ancient Civilization City State Virtual Trip by Tasisei Corporation: http://www.taisei-kodaitoshi.com/index.html]

Giant reservoirs at Dholavira (the largest measuring 263 feet by 39 feet and 24 feet in depth) that together held more than 325,000 cubic yards of water.
http://www.archaeology.org/0011/newsbriefs/aqua.html

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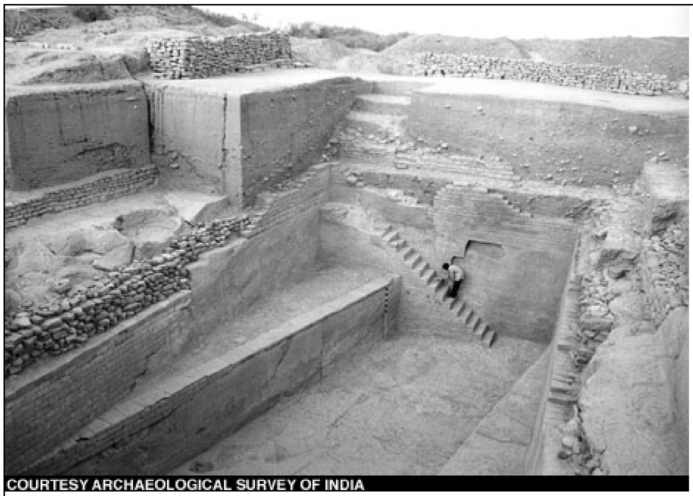
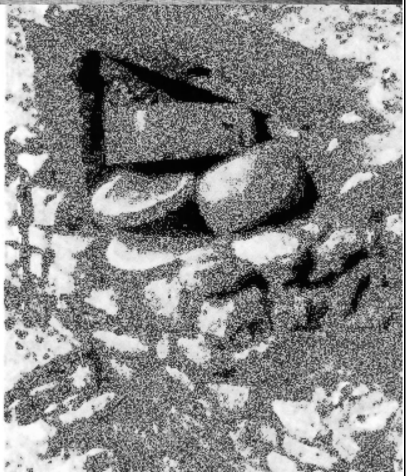


Dholavira. Polished stone pillars and ring-stones found in situ as structural supports for posts to hold multi-storeyed structures are evidences of advances in stone masonry in the Civilization. Similar ring-stones were found in Mohenjodaro. **Limestone ringstones: discarded along a street in HR area, Mohenjodaro (ASI)**



Dholavira, Stage IV. North Gate. An inscription of ten characters was found in North Gate chamber, letters measure 33 X 27 cm. Approx.

Three images after http://bosei.cc.u-tokai.ac.jp/~indus/english/2_4_02.html

The impressive rock-cut reservoir, polished stone pillars and ring-stone bases, apart from stone fortifications and gateways found in Dholavira are an indication of the competence of well-diggers, stone-cutters, builders and masons of the Civilization. This ability to scoop into rock is evidenced in man-made caves of the historical periods, in many parts of Western, Central and Northern Bharat. The word **d.han:gar** means both a metalsmith and a well-digger. A stone-cutter using the chisel and hammer could create such a magnificent structure as the reservoir dug in stone in Dholavira.

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The recent discovery of two sunken rivers and some artifacts from the Gulf of Khamat (which was formed about 10,000 years ago by the incursion of the sea) by the National Institute of Ocean Technology suggests a revision of the chronology for Afghanistan< Baluchistan and Sarasvati Civilization, in the context of Amri-Nal culture occurring in many sites in Gujarat (close to the Gulf of Khambat and Gulf of Kutch) and in the Makran coast. This may hold the key to the extensive trade contacts with Mesopotamia established early in the 3rd millennium BCE.

It is also necessary to have the excavation reports (interim or preliminary) published for the sites already excavated.

Mohenjodaro. House excavation, perhaps that of a merchant. The initial impression of the civilization was that of great commercial cities, such as Mohenjodaro and Harappa, that linked economic regions, but now it seems these cities were marginal to the true focus further East and South, among a large number of settlements on the banks of River Sarasvati not far from the Khetri copper mines and the coastal regions of the Gulf of Khambat and Gulf of Kutch.

Terracotta scale, showing graduations. Kalibangan.

Street flanked by single story houses in Kalibangan, Period I (2450-2300 B.C.).

Recent excavations at Harappa were begun in 1986 by the American team of the Harappa Archaeological Research Project jointly with the Department of Archaeology and Museums of Pakistan.

The site was inhabited continuously from at least 3300 B.C. until several hundred years after the decline of the Civilization (the "Cemetery H" Culture at Harappa), which represents one of the longest periods of occupation at any Indus site. Courtesy, Harappa Archaeological Research Project.

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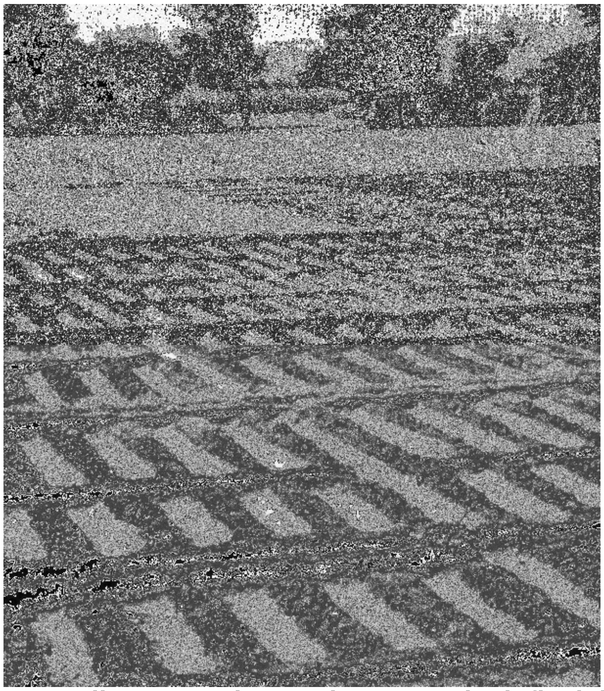
Mohenjodaro, lane between houses.	**Mohenjodaro. Water-borne sewerage system**	**Drain, Mohenjodaro.**

Each house, large or small, was provided with earthenware pipe fitted crossways into the walls and opening into a small individual gutter. This in turn, joined central covered sewers. At intervals there were decantation ditches where the main sewers joined. These were designed to collect the heavy waste so that it would not obstruct the mains.



Kalibangan. The earliest ploughed field in the world so far known. The techniques of furrowing, use of ploughs and solid-wheel carts drawn by bullocks are in use even today, attesting to the continuity

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of agricultural practices since over 4,000 years Before Present. (After Georg Helmes/German Research Project on Mohenjodaro)

Plough. Terracotta model. Banawali. S-shaped with a sharp edge at the point, with a hole at the end of the central component to fasten it to a yoke. The model plough is identical to the shape of the ploughs used even today in Bharatiya villages and villages in the sub-continent. A remarkable finding of domesticated agriculture is the discovery of a ploughed field in Kalibangan, on the banks of River Drishadvati (a tributary of River Sarasvati). The Latin/Greek word, *oryza*, is derived from Tamil *arici*, Kannada *akki*. Roxburgh (*Flora Indica*, ii. 200) notes that a wild rice, known as *Newaree* [Skt. *nivara*, Telugu. *nivvari*] grows abundantly about the lakes in the Northern Circars, and he considers this to be the original plant. Jarrige and Meadow note an indigenous Mehrgarh culture with cereal cultivation circa 6500 BCE and its gradual spread south-east to the Sindhu to develop into Harappan culture circa 3000 BCE. ('The ancetecedents of civilization in the Indus Valley,' in *Scientific American*, Aug. 1980, pp. 122-133). "Prolific use of rice (Cultivated- *Oryza sativa*; wild annual - *Oryza nivara*; and wild perennial- *Oryza rufipogon*) husk and chaff as pottery temper at Koldihwa (PRL 224, ca. 6570 ± 210 BC) and Mahagara (PRL-100, ca.5440 _+ 240 B.C., 4530 + 185 BC), and the discovery of rice grains of cultivated rice at Mahagara establish the cultivation of rice. Electron microscopic studies conducted by Vishnu-Mittre showed that both cultivated and wild species of *Oryza* were present at Mahagara. Neolithic settlement at Mahagara marks a considerable advance in the pattern of settlement perhaps as a result of an altered economy which led to the emergence of separate family house units planned around cattle pens." (K.L.Mehra, http://www.hindunet.org/saraswati/Agriculture1.doc Agricultural foundation of Indus-Sarasvati Civilization).

The diffusion of rice cultivation together with black-and-red ware is demonstrated from Lothal eastwards to Bengal.

Settlement Name, Co-ordinates, Area (ha.)
Balakot (Las Bela) 25-28-30N 66-43-30E 2ha.
Birkot Ghwandai (Swat) 34-41-00N 72-12-00E .0.05ha
Dabar Kot (Loralai) 30-05-00N 68-41-00E 24.30ha.
Dad Kala Kach Kot Dherai (Bannu) 32-57-20N 70--36-15E
Dhillamjo Kot (Dadu) 25-37-00N 68-02-00E
Dhulkot (Jamnagar) 20-50-00N 71-02-00E
Khar Khoda (Meerut) 28-50-00N 76-45-00E
Kot (Kachi) 29-30-00N 67-26-00E
Kot Alabad (Dera Ismail Khan) 32-08-00N 70-18-50E
Kot Diji (Khairpur) 27-16-00N 68-40-00E 2.20ha.
Kot Kori (Thar Parkar) 24-25-00N 69-02-00E
Kot Mandlal (Ludhiana) 30-47-00N 76-03-00E
Kot Raja Manjhera (karachi) 24-58-00 68-08-00E
Kot Waro Daro (Sukkur) 0.60ha.
Kota (Jamnagar) 22-10-00N 69-42-00E 0.80ha.
Kota (Saharanpur) 29-54-00N 77-38-00E

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Kota One (Jamnagar) 22-10-00N 69-42-00E 0.50ha.
Kotada Bhadli (Kutch) 23-22-00N 69-26-00E 8.00ha.
Kotada (Jamnagar) 22-12-00N 70-22-00E 72.00ha.
Kotada (Kutch) 23-18-00N 70-06-00E
Kotar Khana (ropar) 30-13-00N 77-13-00E
Kotara (Kutch) 23-58-00N 69-47-00E
Kotarkhana (Ambala) 30=13-35N 77-13-16E 3.00ha.
Kotda (Jamnagar) 23-14-00N 70-21-00E
Kotiro (Larkana) 27-21-00N 67-25-00E
Kotla Nihang Khan (Ropar) 30-56-00N 76-34-00E 2.60ha.
Kotli (Ropar) 30-53-00N 76-29-00E
Kotra (Kachi) 28-34-00N 67-24-00E
Surkotada (Kutch) 23-37-00N 70-50-00E 1.40ha.

To evolve a strategy for further excavation work, the following frequency distribution of sites, particulary in relation to the ancient river courses, may be taken into consideration.

Sites in Bharat: [District: No. of sites]		**Sites in Pakistan: [District; No. of sites]**
Jind 162 Kurukshetra 78 Karnal 72 Bhavnagar 64 Hissar 56 Banaskantha 53 Ganganagar 53 Amreli 33 Ahmedabad 27	Bhatinda 26 Jaipur 24 Kheda 23 Jamnagar 15 Gurgaon 17 Ambala 14 Jullunder 14 Gurdaspur 9 Broach 7	Bahawalpur 344 Jhalawan 82 Dadu 41 Karachi 19 Dera Ismail Khan 14 Bannu 14 Kachi 13 Bulandshahr 11 Hardoi 7 Kalat 7 Kharan 7

Ongoing exploration work in 40 sites in Haryana

About 40 sites in Haryana, listed for further exploration are: Baniyon ki Haveli and Mai Lachha-ka-kila at village Machharauli (Late medieval period); Jamalgarh (OCP); Butgarh (Post-Gupta and Rajput period); Ramgarh fort (Medieval period); Pansal (Post-Gupta period); Chholi (Kushana); Talakaur (Late Medieval); Kulawar (Rajput and Medieval); Hartan (Gupta and Rajput); Ramgarh (PGW, Kushana and Late Medieval); Chopri (Kushana and Rajput); Bandhev (Kushana and Rajput); Chorghat (Kushana); Bagaru (Kushana to Medieval); Hudia (PGW and historical); Pkoksa (Rajput and Late Medieval); Dhoa (Medieval); Mangalu Rangharan (Late Harappan); Kalwa (Late Harappan, Gupta and Rajput); Babain (Late Medieval); Bhagawanpura (Late Harappan and PGW); Kasithal (PGW, Historical and Medieval); Bir-Dhantori (Late Harappan to Historical); Tatki (Kushana); Khairi (Late Harappan to early historical); Kulapur (Historical); Daulatpur (Late Harappan to Historical); Kanepla (Early Historical); Khanpur Majra (Historical); Bahadurpur

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(Medieval); Bichganwan (Rajpur); Jogna Khera (Early historical to Medieval); Bibipur Kalan (Late Harappan to historical); and Umalcha (Harappan to historical periods).

[The quotes are from a brochure of ASI, Shimla released in April 2003. The excavation team is led by ID Dwivedi, Dy. Supdt. Archaeologist and includes: Jasmer Singh, SK Manjul, Smt. Arvin Manjul, Ashok Kumar, RK Dalal, R Bakshi, RK Sapru, Birender Kuar, Shankar Sharma, Sunil Jha, Mahender Pal, Akshat Kaushik, Smt. Garima Kaushik, Dr. Gautam, Chander B Kumar, RN Pandey, Dinesh Chander and Anil Kumar.]

Ganganagar-Bahawalpur province connection (Sarasvati River)

Ganganagar District (53 sites) in Bharat borders the Bahawalpur province in Pakistan (344 sites).

The clustering of almost 400 settlements in just two districts, one in Bharat (Ganganagar) and one in Pakistan (Bahawalpur) may be seen from the sites listed with the coordinates as follows. The sites are close to the banks of River Sarasvati-Ghaggar (Hakra); and indicate the migration of Sutlej river away from the River Sarasvati to join the River Sindhu and further flow southwards along the sites in Bahawalpur province:

Chak 011	Ganganagar		Mature Harappan Sothi-Siswal	29 14 00 N73 36 00 E
Chak 015/3	Ganganagar		Mature Harappan	29 14 00 N73 36 00 E
Chak 021	Ganganagar		Mature Harappan	29 14 00 N73 36 00 E
Chak 040	Ganganagar		PGW Sothi-Siswal	
Chak 043	Ganganagar		Mature Harappan	29 10 00 N73 29 00 E
Chak 044	Bahawalpur	**0.8**	Mature Harappan	29 13 55 N71 46 15 E
Chak 045	Bahawalpur	**0.7**	Kot Diji	29 13 55 N71 48 48 E
Chak 045 'A' South	Bahawalpur	**1.5**	Mature Harappan	29 11 50 N71 47 27 E
Chak 045 'B' North	Bahawalpur		Mature Harappan	29 13 25 N71 48 00 E
Chak 050	Ganganagar		Mature Harappan	29 10 00 N73 29 00 E
Chak 051	Bahawalpur	**0.5**	Cemetery H	29 11 05 N71 43 50 E
Chak 058/1	Ganganagar		PGW Sothi-Siswal	
Chak 058/2	Ganganagar		Mature Harappan	
Chak 059	Ganganagar		PGW Sothi-Siswal	
Chak 061 East	Bahawalpur	**0.7**	Cemetery H	29 06 30 N71 37 38 E
Chak 061 West	Bahawalpur		Mature Harappan	29 06 27 N71 37 30 E
Chak 069	Bahawalpur	**5**	Cemetery H	29 09 32 N71 51 13 E
Chak 071/1	Ganganagar		Mature Harappan	29 14 00 N73 17 00 E
Chak 072/3	Ganganagar		Mature Harappan	29 10 00 N73 19 00 E

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Chak 075, Bharat	Ganganagar		Sothi-Siswal Mature Harappan	29 10 00 N73 18 00 E
Chak 075, Pakistan	Bahawalpur	**0.4**	Sothi-Siswal Mature Harappan	29 01 33 N71 14 58 E
Chak 076	Bahawalpur	**2.5**	Mature Harappan	29 01 25 N71 14 38 E
Chak 077	Ganganagar		Kot Diji Mature Harappan	
Chak 080	Ganganagar		Mature Harappan	29 12 00 N73 15 00 E
Chak 087	Ganganagar		Rang Mahal	29 13 15 N73 15 00 E
Chak 088 'A' West	Bahawalpur	**8.1**	Mature Harappan Cemetery H	29 06 51 N71 47 30 E
Chak 088, Bharat	Ganganagar		Mature Harappan	
Chak 088, Pakistan	Bahawalpur	**4.2**	Cemetery H	29 06 53 N71 47 50 E
Chak 097	Bahawalpur	**3.8**	Mature Harappan	29 06 24 N71 14 34 E
Chak 107	Bahawalpur	**0.05**	Cemetery H	29 06 24 N71 40 20 E
Chak 112 'P'	Rahimyar Khan	**0.8**	Mature Harappan	28 22 08 N70 29 01 E
Chak 113/10R	Khanewal	**0.6**	Mature Harappan	30 03 00 N71 48 00 E
Chak 121 'A'	Rahimyar Khan	**19.3**	Mature Harappan	28 24 40 N70 36 10 E
Chak 124	Rahimyar Khan	**4.9**	Mature Harappan	28 25 40 N70 37 45 E
Chak 133/10R	Khanewal		Kot Diji Mature Harappan	30 20 00 N71 55 00 E
Chak 271 HR	Bahawalpur	**1.1**	Kot Diji	29 13 10 N72 53 34 E
Chak 280 HR	Bahawalpur	**0.3**	Kot Diji	29 14 19 N72 47 37 E
Chak 315 HR	Bahawalpur	**5.1**	Kot Diji	29 12 07 N72 24 42 E
Chak 337 HR	Bahawalpur	**4.6**	Kot Diji	29 07 40 N72 20 10 E
Chak 341	Bahawalpur	**19.9**	Kot Diji	29 10 27 N72 17 53 E
Chak 353 West	Bahawalpur	**1.6**	Hakra Wares	29 11 06 N72 16 19 E

Nature of technical collaboration/cultural co-operation between Bharat and Pakistan in carrying forward further archaeological explorations of this cluster of sites has to discussed further.

Importance of Bhatinda District (River Sutlej as tributary of River Sarasvati)

The number of sites in the district of Punjab is indicative of the migration of River Sutlej away from River Sarasvati evidenced by the hundreds of palaeo-channels of what are called, ‘Naiwals’.

The western Hakra had three tributaries all of which were called Naiwal (eastern, middle and western Naiwal). These three Naiwals joined near Kurrulwala (29^0 33’N, 73^0 52E), south of the Abohar town. These Naiwals might have constituted the palaeo-channels through which Sutlej joined Hakra.

These naiwals may constitute the remnants of a migratory path of the Sutlej river westward away from the Sarasvati River Basin, and toward the Sindhu River system. In the 13th century A.D., Sutlej had flowed into the Beas valley through two dry beds (one of which was called Dhunda), between the western Naiwal and the present Sutlej.

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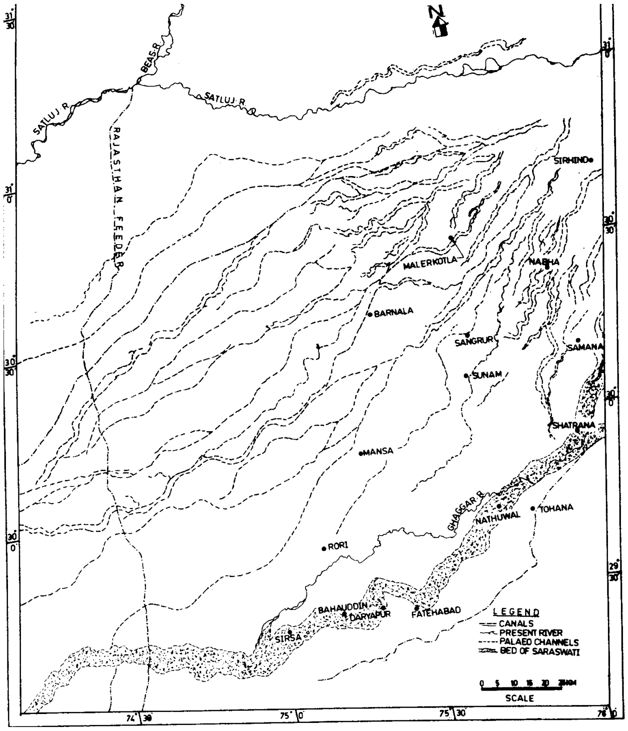
Braided palae-channels of the Sutlej lying between the present Sutlej and the old Sarasvati bed. The present Ghaggar can also ben seen in the map (After Yashpal et al, 1980). The braided palaeo-channels constitute the signatures of the Sutlej river as it migrated westward to join the Sindhu, abandoning the Sarasvati River. The ancient bed of the Ghaggar has an average width of about 6 to 8 kms. from Shatrana to Marot .



The palaeo-channels (ancient courses) of the river system range upto 6 kms. wide and at a place called Shatrana (60 kms. south of Patiala), the width of the channel as seen from IRS 1-C satellite images is 20 kms. Geo-morphological tests report that the Ghaggar river bed at a depth of 30 to 60 m. does contain Himalayan river sediments dated to circa 10,500 - 12,500 Before Present (cf. Singhvi et al). The work of Bhabha Atomic Research Centre scientists corroborates this evidence by tritium (an isotope of Hydrogen) tests of water samples from 800 deep wells around Pokharan. The work done by Central Groundwater Board through a Sarasvati Project in 1999 established the existence of aquifers about 30 to 60 m. below the ground; 23 of the 24 test tube-well drillings were successful in yielding potable waters at the spots indicated by satellite images of palaeo-channels and fault-lines. The Regional Remote Sensing Services Centre, Jodhpur has come out with a comprehensive mapping of the palaeo-channels over the entire stretch from Siwalik ranges to Rann of Kutch correlated with the archaeological sites.

As observed by Prof. Yashpal in 1982 using LANDSAT images, River Sutlej took a 90-degree turn at Ropar and deflected in a north-westerly direction, leaving behind signature tunes of *naiwals* (river channels) moving away north-westwards from Shatrana. Geologists surmise that such deflections of rivers or migrations are generally attributed to tectonic events. The earthquake which shook Bhuj is seen to be a recurring event (as noted by Prof. Valdiya and Dr. JG Negi, in a 250-year recurrence, evidence Allah Bund); such plate tectonics (Indian-Eurasian plate clash which is dynamic even today since the Indian plate is moving northwards, at the rate of 7 cm. per year) which have a wave-form result in land uplifts and land submergences, not excluding sea incursions (witness submergence of Dwaraka). The Aravalli ranges parallel the fault line which has structural control over the entire North-west Bharat terrain; rivers east of the ranges tend to migrate eastwards, rivers west of the ranges tend to migrate westwards, thus resulting in a north-westerly tilt of the entire north-west Bharat terrain.

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Northwestern India with its present day river system and the major palaeo-channels as deciphered from the Landsat imagery (After Yashpal, et al 1980, Fig. 49.1 in Lal and Gupta, 1984).

Yash Pal, Baldev Sahai, R.K.Sood and D.P. Agrawal, Space Applications Centre, and PRL, Ahmedabad, 1980, Remote sensing of the `lost' Sarasvati river: Proc. Indan Acad. Sci. (Earth and Planetary Sci.), Vol. 89, No. 3, Nov. 1980, pp. 317-331: `` ... For miles and miles around Marot one finds numerous place names with a suffix toba, which in the local language means a playa (or rann) ... It is obviously improbable for such a mighty river to vanish into a shallow depression (or khadins in the local languages) in its heyday. There is, therefore, a good possibility that the Ghaggar flowed into the Nara and further into the Rann of Kutch without joining the Indus ... `` ... If the bore-hole samples from these areas are analysed, one is sure to come across mineralogical compositions reflecting the signatures of the ancient Sutlej and the Palaeo-Yamuna when they flowed through the Sarasvati bed ... A multidisciplinary approach employing archaeological, mineralogical, chemical and thermoluminescence, combined with remote sensing techniques can provide a clear and consistent history of these changes in the palaeochannels of northwestern sub-continent in an absolute time-frame."

These findings establish the ground-truth of River Sarasvati, with a course independent of the Sindhu River system, running about 300 kms. east of the Sindhu course. The flow of R. Sarasvati in Gujarat beyond Rann of Kutch into Saurashtra is still an open question for further investigation by ecologists and historians alike. There are indications from the Gulf of Khambat discoveries by NIOT that the Saurashtra uplift might have occurred when the Gulf itself was formed about 10,000 years ago submerging the ancient channels of Rivers Narmada and Tapati. If so, River Sarasvati could as well have flowed through the Nal Sarovar, through Lothal, Padri, Rangapura up to Somnath (Prabhas Patan). All ancient texts are consistent that the *sangamam* of River Sarasvati with the saagara was at Prabhas Patan. The Great Epic also refers to the submergence of Dwaraka by the onrushing waves from the ocean in *Mausala Parva* with an exhortation from Sri Krishna to the residents of the city to move south of Prabhas Patan (Somnath). This may indeed correlate with a reference in Sangam literature text (*Patirruppattu*) that the Chera kings trace their lineage of 42 generations from Dwaraka (i.e. from circa 1500 BCE, assuming an average period of 25 years per generation). In the context of dating the river courses, in the context of settlements of people on river-banks, the most accurate dates are obtained from the over 2000 archaeological sites ranging between 3500 BCE (Dholavira, Kalibangan) to 1500 BCE (Dwaraka, Kunal). The largest sites of the civilization which have not been excavated are in Bhatinda district (Gurnikalan and Hasni). Rakhigarhi excavations are ongoing. Ganweriwala has not been excavated. Gurnikalan, Hasni, Rakhigarhi and Ganweriwala are larger than either Harappa or Mohenjodaro in extent.

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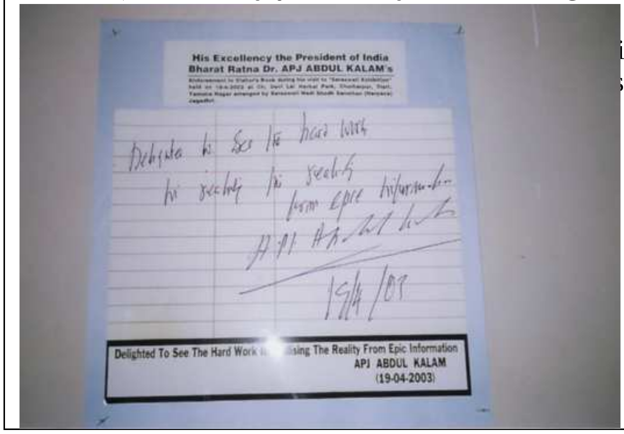
Sarasvati Dars'an

Dr. S. Kalyanaraman, Director, Sarasvati Nadi Shodh Prakalp (Akhil Bharatiya Itihasa Sankalana Yojana) in conversation with H.E. the President of Bharat, Bharat Ratna, Dr. APJ Abdul Kalam during the President's visit to Sarasvati Darshan Exhibition organized at Yamunanagar on 19 April 2003. Seen in the photograph are (from left to right) are: Shri Lakshya, Jagadhri; Shri Darshan Lal Jain (President, Sarasvati Nadi Shodh Sansthan, Haryana, Jagadhri); Shri I.D. Dwivedi (Dy. Supt. Archaeologist, the discoverer of an ancient settlement on banks of River Sarasvati at Adi Badri - partly seen); Dr. Baldev Sahai (ex-Chief, Space Applications Division, ISRO, Ahmedabad and President, Sarasvati Nadi Shodh Sansthan, Gujarat, Ahmedabad); Dr. Vijay Mohan Kumar Puri (ex-Director, Geological Survey of India, Dharmashala, discoverer of glacial sources of Vedic River Sarasvati); Shri Sanjay K. Manjul, Archaeologist; President of Bharat; Shri Deepak Lal Jain, Haribhau Vaze (National Organizing Secy., i, partly seen). In the background may be seen satellite images and artefacts discovered at Adi



When His Excellency the President of India, Bharat Ratna Dr. APJ Abdul Kalam visited

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the exhibition organized at Omchandra Devi Lal Herbal Park at Chuhurpur, near Jagadhri, on 19 April 2003, he was impressed by the satellite images, revenue records and other evidence presented to establish River Sarasvati as ground truth and he made an endorsement in the Visitors' Book, 'Delighted to see the hard work in realizing the reality of epic information'.

Three projects to revive the legendary Sarasvati River were designed during the years 2003-4.

One project is to link re-activate the ancient channels of the river from Adh Badri (Yamunanagar Dist.) to Pehoa (referred to as Pruthudaka in the Great Indian Epic, Mahaabhaarata)

The second project to provide a piped feeder from the Bhakra Main canal to Pehoa, using the perennial waters of the Sutlej emanating from the Mansarovar glacier in Mt. Kailash. 50% of the cost is financed by a private philanthropist.The river channel from Adh Badri to Pehoa is mentioned as Sarasvati Nadi on the Survey of India topo-sheets. This project is financed by the World Bank as part of the package of $139 million US Dollars for rejuvenation of the water systems of North West India. The re-activation of this section will keep the river flowing all 365 days of the year upto Pehoa and beyond. Pehoa has the ancient Vasishtha ashram where the Sarasvati River becomes east-flowing and Sarasvati Ghats where homage to ancestors (pitru tarpan.a) is offered by pilgrims. The ghats are more ancient than the pilgrimage ghats in Varanasi on the Ganga River. This pilgrimage site was also visited by Balarama during his pilgrimage from Dwaraka to Mathura along the course of the Sarasvati River which is described in the shalya parvam of the Great Indian Epic
The third project is to map the ancient drainage system of the Sarasvati River and identify groundwater aquifers and sanctuaries, over a stretch of 1600 kms. from Bandarpunch massif in Western Garhwal (Har-ki-dun glacier) to the Arabian Sea near Somnath (Prabhas Patan, Gujarat) using the remote sensing application centre in Jodhpur, Rajasthan and tritium analysis by atomic scients in Bhabha Atomic Research Centre This is a pre-requisite for re-designing the drainage system of NW India to benefit over 200 million people of the River Basin.

Himalayan glaciers: source of River Sarasvati [After VMK Puri, 1998]

Many challenges lie ahead in completing the rejuvenation of the Sarasvati River Basin from Har-ki-dun glacier in W. Garhwal upto Somnath, Gujarat stretched over four ecological zones: receding Himalayan glaciers, Siwalik foothills, semi-arid Marusthali and marshy Rann of Kutch and Saurashtra. The ambitious project profile includes: a comprehensive design of the NW India Drainage System and review of land-use patterns and afforestation programmes (including growing of halophytes—salt-resistant cash crops such as Salicornia brachiata), action to stop the receding glaciers in Uttar Pradesh (W. Garhwal) and Himachal Pradesh, resolving water-logging problems in Haryana and Punjab, recharging of the groundwater resources in Rajasthan and Kutch by extending the Rajasthan Canal beyond Jodhpur, using the waters of the Rajasthan Canal (which draws the waters from the perennial source of Sutlej – Manasarovar)—to recharge the groundwater resources, provision of additional wells in the entire Basin, use of solar and wind-power to power the pumpsets for tubewells, and, improvement of subsurface drainage system in the entire Sarasvati River Basin. Conjunctive development of watershed projects in Rajasthan and Gujarat using the groundwater resources and recharge facilities using perennial surface waters will be essential to evolve changes in the land-use patterns in the region and to provide the basic need of drinking water facilities in the semi-arid and marshy ecological zones of Bharat..

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To effectively regulate the implementation, in an integrated manner, of the range of projects in complex ecological zones and some zones subject to tectonic disturbances, it is essential to constitute a Sarasvati River Basin Authority.

A number of organizations are involved in the research and project work:National Remote Sensing Agency, Geological Society of India, Bhabha Atomic Research Centre, Central Water Commission, State Water Resources Agencies, Central Arid Zone Research Institute, Central Arid Zone Forest Research Institute, Indian Space Research Organization. Satellite images from LANDSAT, EOSAT, IRS 1-A to 1-D have been put to extensive use in the research studies.

The River originates from the Himalayan glaciers in Har ki dun in Uttaranchal. Over 5000 years ago, the river flowed over a distance of over 1600 kms. draining the North west Bharat, through the states of Himachal Pradesh, Haryana, Punjab, Rajasthan and Gujarat, to reach the Sindhu Sagara at Prabhas Patan (Somnath) as described in the *Mahabharata* and other ancient texts. Tectonic and river migration causes for the desiccation of the river about 3500 years ago have been established using satellite image analyses, geomorphological studies, Bhabha Atomic Research Centre findings based on tritium analysis of abundant ground water resources discovered in the Sarasvati River Basin in the middle of the Rajasthan Marusthali desert, which will enable the construction of over 1 million tube wells for potable water, after recharging the groundwater aquifers using surface channels of the reborn Sarasvati river which is an integral part of the project to interlink national rivers of Bharat. This project costing about $120 billion will change the face of Bharat and take the nation to a developed status in 7 years' time. The feasible project can be expedited using 3 D Radar Topography; the satellite technology will also help monitor hydrological flows by establishing a National Water Grid comparable to the National Power Grid for ensuring equitable distribution of water resources of the Himalayas throughout the country using mostly gravity flows. The project will help control floods and also recurrent water shortage or drought situations in some parts of the nation. In this context, the President expressed his desire to visit Adi Badri to see the work in progress to ensure the flow of River Sarasvati all 365 days of the year for the benefit of pilgrims visiting tirthasthanas and to promote command area of irrigation in the region for the benefit of millions of farmers.

Sarasvati Sarovar/River at Adi Badri, Haryana

An eye-witness report from Adi Badri, Haryana (S. Kalyanaraman[3])

It was a thrilling experience when we visited Adi Badri, recently, a place where River Sarasvati emerges into the plains. We were overwhelmed to see in the Sarasvati River valley nestled in the foothills of Himalayan glaciers, a magnificent, engineering marvel converting the valley into a sarovar. The valley now bears the appearance of a **tapo-bhumi** since it has been transformed into a pilgrimage-heritage site. Devoted pilgrims will throng the site in thousands in the days to come to find spiritual solace and re-energize themselves for their life-mission. Students of history will find at the site, an experience of their life-time, related to our historical and cultural heritage and see their own images mirrored in the sarovar

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[3] Dr. S. Kalyanaraman, Sarasvati Nadi Shodh Prakalp, Akhila Bharatiya Itihasa Sankalana Yojana, 3 Temple Avenue, Chennai 600015 Tel. 044 22350557 kalyan97@gmail.com http://www.hindunet.org/saraswati 2 November 2004

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as a tribute to our ancestors who created the Sarasvati civilization. Apart from being a pilgrimage-heritage site, the site should now be added to the structures to be visited by all water management experts from all parts of the country, to witness a stellar example of water-harvesting and watershed management. We feel confident that the vision offered by the Sarasvati valley at Adi Badri, will be an inspiration to the youth of Bharat, who will be able to carry the torch of converting Bharat into a developed nation, realizing the India Vision 2020.

Sarasvati Sarovar at Adi Badri

Sarasvati River valley at Adi Badri (May 2004)

Sarasvati River Sarovar, under construction, at Adi Badri (June 2004)

Sarasvati Sarovar at Adi Badri (October 2004)

Sarasvati Sarovar has been constructed and is ready to be dedicated to the nation at the foothills of Siwalik mountains at Adi Badri, 40 kms. north of Jagadhri (Yamunanagar), Haryana. The Sarovar is located at the place where River Sarasvati emerges, at the present time, into the plains from Himalayan glaciers. The sarovar which has bathing ghats makes Adi Badri a pilgrimage and heritage site. Enroute from Jagadhri, the pilgrims can also visit Kapalamochan-Rinamochan where melas are held every year – Karthik Purnima day and Vasanta Panchami day (the day commemorating the birth of River Sarasvati) -- and visited by lakhs of pilgrims.

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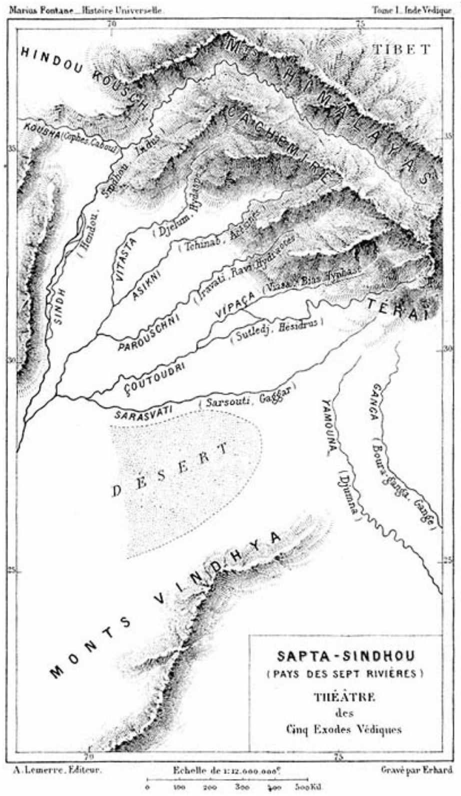
Manuscript written by Shri Guru Govind Singh, Gurudwara at Kapalamochan,
Dist. Yamunanagar

At Kapalamochan is a gurudwara commemorating the visit of Guru Govind Singh. A copper plate inscription and a manuscript written by Guru Govind Singh himself is available at this site. Adi Badri is located at a distance of 40 kms. from Jagadhri which can be reached either from Kurukshetra or Ambala on a two-hour journey by road. Ambala is on the National Highway 1 and is on the Highway linking Delhi-Panipat-Kurkshetra (Pipli)-Ambala. Jagadhri also has a Railway Station on the railway line linking Delhi and Jullundur.

Impetus for National Water Grid and making Bharat a developed nation

The Sarovar, measuring 80 m. X 82 m., with bathing ghats, is situated amidst the embrace of Himalayan ranges and in an idyllic setting in the valley overlooked by the mandirs of Adi Narayan, Kedarnath and S'akti Mantra Devi, in the surrounding hilltops. Enveloping the Sarovar is a Herbal garden with rare herbal plants of vedic heritage. The construction of the Sarovar is a stellar example of watershed management and afforestation utilizing 11 check-dams as water-harvesting structures. The waters of Sarasvati river like the waters of River Ganga are clean, clear, pure and without any contaminants.



Map of Sapta Sindhu (Nation of Seven Rivers): Theatre of Pan~cajana_h,Five Peoples Marius Fontane, 1881, *Histoire Universelle, Inde Vedique* (de 1800 a 800 av. J.C.), Alphonse Lemerre, Editeur, Paris

The dedication of Sarasvati Sarovar to the nation, together with the rebirth of River Sarasvati will provide an impetus to create a National Water Grid using the waters of the country as a national resource to be optimally used in all parts of the country and shared with all people whose lives are dependent upon water resources. The creation of a National Water Grid as a Peoples' Project, utilizing the glacier waters, river run offs, tanks, swamps, groundwater aquifers and even desalinated sea water has the potential to make Bharat into a developed nation by 2020, providing

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employment opportunities for crores of people and doubling agricultural production to 400 m. tonnes per year to empower the villagers of Bharat.

Rebirth of River Sarasvati for greening north-west Bharat

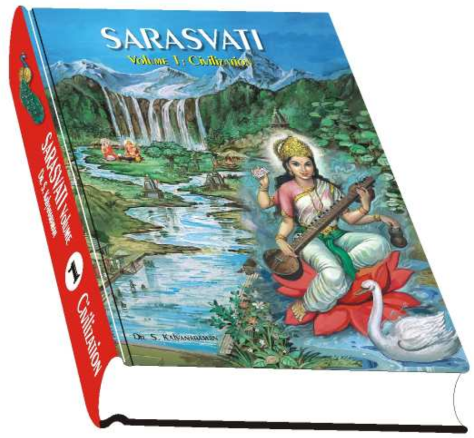
What started as a historical quest in search of Vedic river Sarasvati has now blossomed into a model for water management systems in the country. River Sarasvati is coming alive again to make the north-west Bharat fertile and convert the Marusthali (desert) into green pastures and plantations, thanks to the Rajasthan Nahar (canal) which utilizes the waters of Rivers Sutlej and Beas from the Harike Reservoir. The foundation tower at Mohangarh (55 kms. west of Jaisalmer) refers to the flow of the channel as Sarasvati Mahanadi Roopa Nahar. This is appropriate since River Sutlej was originally an anchorage tributary of River Sarasvati.

Historical importance of River Sarasvati

The Sarasvati Sarovar is located close to three archaeological sites discovered and excavated on the banks of River Sarasvati. In one of the excavations undertaken by Archaeological Survey of India (ASI), high-grade metamorphic rocks belonging to the palaeo-glaciated regions of Central Himalayas, have been discovered. It implies that the Sarasvati River had entered Indo-Gangetic plains from Himalaya at Adi Badri where the present Sarovar has been constructed. This scientific discovery has been reported by Dr. V.M.K. Puri, the country's most eminent glaciologist. A s'ivalinga has also been discovered together with artifacts of potsherds, bangles relatable to Sarasvati civilization. At one of the sites, a Buddha vihara has been discovered together with the statue of a seated Buddha.

Sarasvati Civilization

The roots of Bharatiya culture are to be found on the banks of River Sarasvati. Sarasvati River, adored in Indian Civilization from the days of the Rigveda, is not a myth but a reality, not a legend but ground-truth. The multi-disciplinary researches have conclusively established the ancient course of the river in the north-western part of Bharat. Scientific investigations, recorded in the Memoirs of Geological Society of India, have also established the reasons for the desiccation about 4000 years ago as due to plate tectonics and resultant migrations of the tributary rivers, River Sutlej and River Yamuna. River Yamuna captured the waters of River Sarasvati at Paonta Saheb (Himachal Pradesh), flowed through the Yamuna tear in Siwalik ranges and migrated eastwards to join River Ganga at Prayag, constituting the Triveni Sangamam. River Sutlej (S'utudri in Rigveda) took a 90-degree turn at Ropar, 50 kms. North of Chandigarh and migrated westwards to join River Sindhu. On the banks of River Sarasvati was nurtured a civilization, attested by over 2,000 archaeological sites on the river basin, making it appropriate, as suggested by many archaeologists, to name it as Sarasvati Civilization, instead of Indus Valley or Harappan Civilization.



The visit to Adi Badri by Dr. S. Kalyanaraman, Sarasvati Nadi Shodh Prakalp (website http://www.hindunet.org/saraswati with over 30,000 files, author of 7-volume encyclopaedic work on Sarasvati, Bangalore, Babasaheb Apte Smarak Samiti, 2003), Shri Haribhau Vaze, National Organizing Secretary, Akhila Bharatiya Itihasa Sankalana Yojana was organized on 5 October, 2004 by Shri Darshan Lal Jain, President, Sarasvati Nadi Shodh Samstan, Jagadhri (Haryana), Shri Vaibhav Garg, Jt. Secretary of the Samsthan and other workers. The visit brings back the memories of the late

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Shri Moropant Pingle and the late Padmashri Dr. HaribhauVakankar who led a team of 40 scientists and scholars in search of Vedic River Sarasvati after performing yajna at Adi Badri temple, close to the place where the Sarovar now stands dedicated to the nation as a living testimony to their vision.\

Sarasvati River in Gujarat

Rebirth of River Sarasvati in north-west Bharat

Sarasvati Mahanadi Rupa Nahar, Mohangarh; 40 ft. wide, 12 ft. deep (Feb. 2002)

Rebirth of River Sarasvati is taking place. A Sarasvati Sarovar has been dedicated to the nation at Adi Badri (Yamunanagar, Haryana) at the foothills of Siwalik range of mountains. The Rajasthan Nahar which is fed from the glacier waters of Rivers Sutlej and Beas from Harike reservoir is now bringing waters upto Danan in Barmer District using a 40 ft. wide and 12 ft. deep channel. This canal can be extended further upto Rann of Kutch and upto River Sabarmati by adding the waters of River S'arada through an aqueduct across River Yamuna. This is part of the perspective plan drawn up by National Water Development Agency, for creating a National Water Grid. It will be a golden day in the history of Gujarat when the glacier waters from Manasarovar, Mt. Kailas in Himalaya reach upto River Sabarmati near Ahmedabad. This can be accomplished within the next 3 years since the Sarasvati Nahar has to be extended by only about 200 kms. to reach Gujarat bringing the sacred waters of the reborn River Sarasvati.

Possible course of River Sarasvati in Gujarat from Rann of Kutch through Nal Sarovar, Lothal, Padri, Rangapura, upto Somnath (Prabhas Patan).

National Water Grid

The creation of National Water Grid has the potential to make Bharat a developed nation by 2020 and the rebirth of River Sarasvati in Gujarat will provide an impetus to reach the Brahmaputra waters upto Kanyakumari. Similarly, using the nuclear power plant (using semi-permeable membrane technique and pressurised water) available at Kalpakkam nuclear power station, designed by Dr. Bhattacharjee, seawater from the coastal regions of Gujarat and the saltywaters of River Luni can be desalinated to supply fresh water to coastal towns of Gujarat and along the Luni River basin. The rebirth of Sarasvati in Gujarat will help solve the problems of water resources in Gujarat for many generations to come.

Historical facts

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According to almost all ancient texts of Bharat, starting with Tandya Brahmana and other Puranas and Itihasas, the Vedic River Sarasvati joined the sindhu sagar at Prabhas Patan (Somnath). Recent scientific discoveries point to this bharatiya tradition as historical truth.

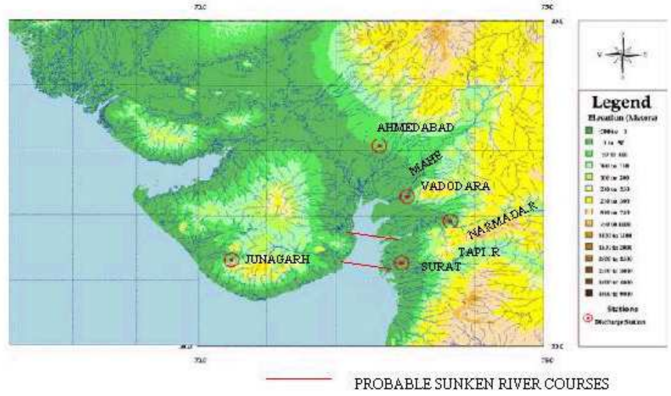
In Mahabharata, in s'alyaparva, there are many verses describing the pariyatra of Shri Balarama, elder brother of Shri Krishna from Dwaraka, through Somnath and along the banks of River Sarasvati upto Plaksha Pras'ravana in Himalaya. On the way, Shri Balarama offers homage to our ancestors and prays in many as'rama-s of rishi-s. Some places mentioned are: Prabhas Patan, Udapana, Chamasobheda, S'ivodbheda, Nagodbheda, Pruthudaka, Kurukshetra, Karapachava (Yamunotri). Further researches are necessary to precisely locate these places.

Scientific discoveries

Siwalik hills were left-laterally displaced. NNW-SSE-trending tear fault is still active. The earlier west-flowing rivers were swung southwards, following the path of the fault. The Bata stream which joins Yamuna from the west has a very wide valley. [NRSA, ISRO, Hyderabad]

Prof. SS Merh and Dr. Sridhar of University of Baroda have identified the ancient delta areas of River Sarasvati in the Rann of Kutch, an area which was perhaps composed of islands exemplified by the archaeological discovery of Dholavira (Kotda).

LOCUS OF SUNKEN RIVERS (Gulf of Khambat), FLOWING EAST TO WEST INTO SAURA_S.T.RA
Submergence of Dwaraka is mentioned in Mahabharata (Mausala Parva), caused by rise in sea-level and incursion of sea into coastal land.



National Institute of Ocean Technology has discovered that the ancient courses of Rivers Narmada and Tapati were submerged by the incursion of the sea and creation of Gulf of Khambat, about 10,000 years ago. Two archaeological sites have been discovered on the banks of these submerged rivers, about 30 metres below the sea level. These sites are located between the sites near Surat and the sites of Lothal and Padri in Saurashtra, pointing to a Gulf of Khambat archaeological complex on the banks of Vedic River Sarasvati. It is not mere coincidence that the place name of the town in Surat is called Bharuch, which is Bhrugukaksha in Mahabharata. Bhrugu was an ancient Rigvedic rishi.

Earthquakes in Kutch and Saura_s.t.ra, with E-W trending faults. Bet Dwaraka and Dholavira are close to these faults. [After Biswas, 1987; Rajendran and Rajendran, 2000].

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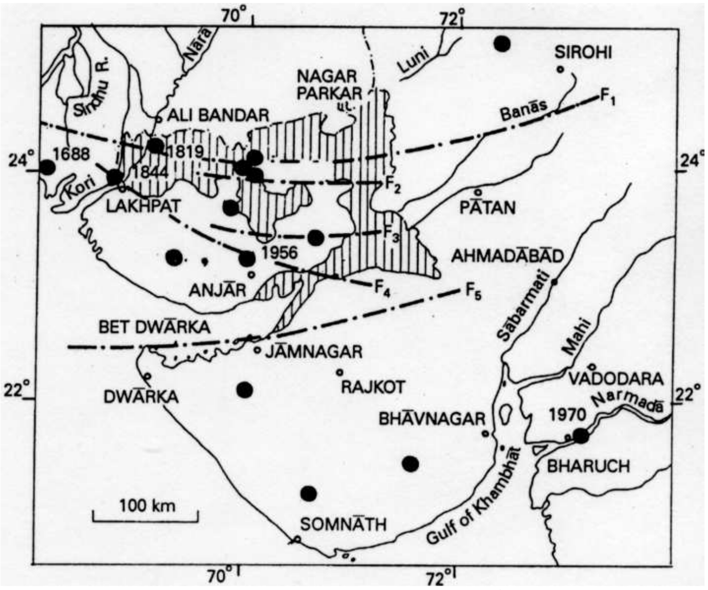

As the Indian plate continues its journey moving north at the rate of 6 cms. per year and hits against the Eurasian plate, resulting in plate tectonics, and continuing rise of Himalaya at the rate of 1 cm. per year, river courses undergo many changes caused by the upliftment of land formations in some regions and subsidence in others. Combined with the plate tectonic earthquake of the type which occurred in Bhuj on 26 January 2001, the incursion of the sea eroding the coastline of Gujarat and most of Bharat's coastline of 7500 kms., the settlements located close to the coastline can be identified by marine archaeological explorations. The discovery of Dwaraka and Lothal as archaeological sites of Sarasvati Civilization (about 4500 years Before Present), point to the essential maritime, riverine nature of the civilization.

Cultural heritage

Discovery of the burial of a woman in Mehergarh, 300 kms. north of Rann of Kutch, revealed jewellery and a wide bangle made of s'ankha. This burial is dated to 6500 Before Common Era. The s'ankha industry continues even today in the Gulf of Khambat and Gulf of Mannar of Bharat, attesting to an 8500 year old continuing industry since the s'ankha species called turbinella pyrum has provenance only in the coastline of Bharat and nowhere else in the world. The discovery of s'ankha industry may explain the reason why one of the jyotirlinga sthan is called Omkares'var situated on the confluence of Rivers Narmada and Kaveri. The sound om is the sound generated by the s'ankha used as a trumpet. Mahabharata refers to the panchajanya (literally, born of five people) which is the s'ankha of Shri Krishna.

The discovery of over 500 archaeological sites along the coastline of Gujarat, south of Dholavira, the existence of Nal Sarovar which links up Little Rann of Kutch with Gulf of Khambat during monsoon periods when the Nal Sarovar expands, point to the possibility that River Sarasvati had coursed beyond Rann of Kutch into Saurashtra through Nal, Lothal, Padri, Rangapura and upto Prabhas Patan (Somnath). It is also likely that the ancient courses of Rivers Narmada and Tapati had also coursed through the present day Saurashtra which has uplifted regions caused by recurrent plate tectonic events.

Rebirth of River Sarasvati

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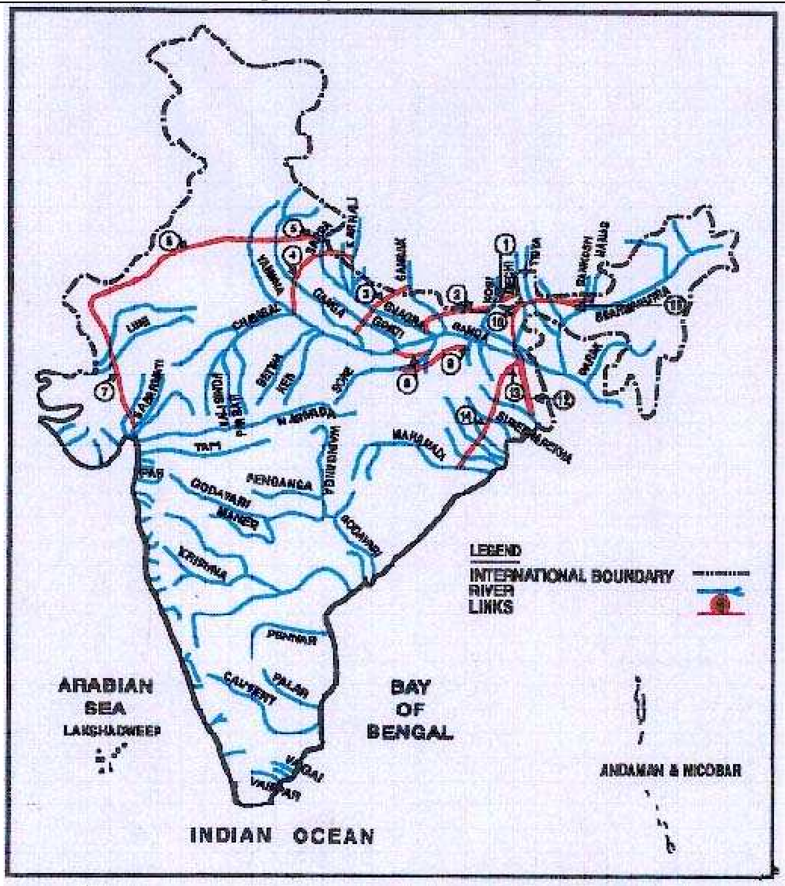
Projects are ongoing which will have a long-term beneficial impact on major parts of North West India and revive memories of over 5,000 years ago, by reviving the mighty Sarasvati River. A mighty perennial river which had nurtured an ancient civilization which has given us the Vedas, had been desiccated due to tectonic causes, river migrations and aeolean activity (aandhi phenomenon). This is an unparalled event in the history of human civilization. Today technological means are available to revive this sacred river and to make the legacy of Sarasvati meaningful not only to entire Bharat but to the whole world. The project to revive Sarasvati River will be a superb project, of international significance.

The complete course of Vedic River Sarasvati as described in the vedic texts, itihaasa and purana has been delineated thanks to multi-disciplinary scientific investigations.



Himalayan component of National Water Grid: Reborn Sarasvati River in Gujarat (Link 5, 7); National Water Development Agency, Govt. of India, Min. of Water Resources; Perspective Plan. These links are Interlinking Canal Systems to Transfer Surplus Flows of Eastern Tributaries of Ganga to the West benefiting U.P., Uttaranchal, Haryana, Rajasthan & Gujarat

The details of the projects which could accomplish the Rebirth of River Sarasvati with optimal use of

1. glacialsources of water,

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2. waterharvesting and
3.interlinking of rivers as part of a National Water Grid to achieve Developed Bharat Vision 2020.

1. Construction of Sarasvati Sarovar with 11 check dams at Adi Badri, Yamunanagar Dist., Haryana. This is an excellent example of integrated watershed management: waterharvesting, ecology conservation and development of a Vedic herbal garden. The sarovar has been so constructed as not to disturb the flow of the ancient Sarasvati channel at Adi Badri into the Sarasvati Creek/River that flows beyond Kapalamochan, Ajatashram, Bibipur Lake and Pehoa.

2. The continuation of waterharvesting techniques to reactive the ancient Sarasvati River channels which are shown on Survey of India toposheets and in Village Revenue records. This can integrate the subsurface drainage systems with surface runoffs taking into account the present-day conditions of irrigation systems based on tube wells since at many places, the groundwater is topping upto the surface.

3. At Pehoa (Pruthudaka), bathing ghats have been created using tube wells to augment the flows within the Sarasvati River Stream.

4. Linking up the monsoon waters through Sarasvati River beyond Pehoa and Sirsa with the Rajasthan Nahar (Rajasthan Canal) is the next phase of the rebirth of Sarasvati. The Nahar draws from the perennial glacier waters of Rivers Sutlej and Beas which are gathered through Bhakra-Nangal and Pong Dams at Harike Reservoir. The Nahar has gone beyond the zero point of Mohangarh (55 kms. West of Jaisalmer close to Pakistan border) and is flowing upto Gedra Road in Barmer Dist. Projects are ongoing to line the canal from Mohangarh to Gedra Road. The Nahar has already produced dramatic results; a good example of the benefits of interlinking of rivers, by the disappearance of sand dunes and forestation in Rajasthan Thar Desert! Lakhs of acres of land have been brought under cultivation and drinking water reaches the cities of Jodhpur and Barmer. It is significant that a project completion tower erected at Mohangarh refers to this Nahar as Sarasvati Mahanadi Rupa Nahar, attesting to the desires of the local people.

5. Originally, the Rajasthan Nahar was designed as a navigable channel to provide the multiplier effects of a waterway as an economic means of transport, a transport alternative. By reviewing this original design option and by starting the Links 5 and 7 of the Perspective Plan drawn by National Water Development Agency (Govt. of India, Min. of Water Resources), the Nahar can be extended upto River Sabarmati as shown in Map 2. The major components of the Links are a channel from River Sharada across Yamuna to join with the Nahar: a. Karnali-Yamuna; Sharada-Yamuna; Yamuna-Sirsa Branch of Western Yamuna Canal (Rajasthan); Ganga-Sirhind Canal; Ganga-Sirhind Canal; Tajewala-Bhakra; Hariki Tailend of Rajasthan Canal; Extension of Rajasthan Canal to Sabarmati.

6. Extension of the Rajasthan Canal beyond Gedra Road, Barmer Dist. can be done on a priority basis in two stages: a distance of about 100 kms. upto Rann of Kutch and a further distance of 150 kms. upto Sabarmati.

7. Suggestions for design criteria are:

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- making the reborn Sarasvati River stream a navigable channel;
- construction of percolation tanks along the canal route to provide for groundwater recharge since it is possible to construct one million sustainable tube wells in Thar desert alone using the aquifers just below 30 to 60 m. below the surface, now subject to slow recharge from northerly sources;
- As part of the National Water Grid, desalination of waters of streams such as River Luni and along the coastline of Gujarat for drinking water needs of coastal cities and towns, can be achieved using the desalination plant designed by Dr. Bhattacharjee of Kalpakkam Power Station, Chennai using semi-permeable membrane and pressurized water techniques at a cost of 4.5 paise per litre;
- Plantations of walnuts, dates and other high-value cash crops, together with halophytes such as salicornia brachiata as an edible oil resource all along the Sarasvati River Basin;
- Restoration of tirthasthana and ashramas of Rishis and munis as pilgrimage/heritage sites with bathing ghat and lodging facilities for pilgrims.

River Sarasvati is adored in the *R.gveda* and in the *Mahabharata*. It is dotted with ti_rthastha_na and a_s'rama of many r.s.i-s, the Veda dras.t.a_.

Place Name	**R.s.i**
Chandi	Cyavana
S'ri Kolayatji	Kapila
Pehoa (Pr.thu_daka)	Vasis.t.ha
Markanda River	Ma_rkan.d.eya
Jageri, Bikaner	Ya_jn~avalkya, S'aunaka
Beas River	Vis'vamitra

The day is not far off when Balarama's pilgrimage along the tirthasthana and rishi as'rama on the banks of River Sarasvati will be revived with Sarasvati's children from all parts of the globe paying a homage to naditame Sarasvati.

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End Notes

[i] The section on vra_tya tradition, draws from the references cited in: V.W. Karambelkar, 1969, Vedic Maha_vrata, in: *KR Cama Oriental Institute Golden Jubilee Volume*, Bombay, pp. 159 to 178; Radhakrishna Choudhary, 1964, *The Vra_tyas in Ancient India*, Varanasi, The Chowkhambba Sanskrit Series Office; Chowkhamba Sanskrit tudies,Vol. XXXVIII; and J. Hauer, 1927, Der Vra_tya, Stuttgart.

[ii] **Age of the R.gveda**

"In the nineties of the 19th century, a hot controversy raged round the problem of the determination of age of the R.gveda. It was B.G. Tilak who set the ball rolling in 1893 by publishing his famous ORION, in which he tried to prove the antiquity of the Veda by means of literary and astronomical evidence, viz. that it began in 4000 BC. Absolutely in an independent way, working at Bonn, far away from Poona where Tilak had his residence, H.G. Jacobi had arrived almost at the same time at a conclusion by his careful study of the Vedas and the Bra_hman.as that the anient Indo-Aryans knew of a Naks.atra-series viz. the Mr.gas'iras-series older than the Kr.ttika_-series which lasted according to Tilak from about 5000 BC to 3000 BC in which the R.gveda was composed. Jacobi was of opinion that the beginning of Vedic literature should be placed in 4500 BC...Buhler's reaction to the almost identical views of the two scholars resulted in the publication of his 'Note on Professor Jacobi's Age of the Veda and Professor Tilak's ORION' in the *Indian Antiquary*, 1894 (September), in which he declared that both of them had made good their main proposition,viz.that the ancient Indo-Aryans had once an older Series of the Naks.atras with Mr.gas'iras at the vernal equinox...In my Presidential Address at the 19th session of the Indian History Congress at Agra in 1956 (Indian Historical Quarterly, vol.No.4 (Dec. 1956), Supplement), the date of Manu the first of the Indo-Aryan kings aas 3966 or 4000 BC was arrived at in the following way approximately, whose sacrifices are mentioned in the RV. The beginning of the reign of Candra Gupta Maurya in 322 BC and of 9 Nandas and 6 later S'is'una_gas from Bimbisa_ra to Maha_nandin for 100 years and 169 years respectively are found recorded in history, the total number of years that passed between Bimbisa_ra and the beginning of the Christian era is therefore 591. Prior to Bimbisa_ra, there were 125 kings viz. 4 undated or 5 earlier S'is'una_gas, 5 Pradyotas, 22 Br.hadrathas after Bha_rata War, and 94 kings (including Manu, and excluding Abhimanyu who did not reign) before them. (See the Vedic Age, ed. by RC Majumder, Pusalkar's list of traditions kings). No dated historical record is available about them, but of their names and in some cases their activities were memorised by a special class of people and handed down from generation to generation, in the form of Pura_n.as.This historical tradition is much helpful in reconstructing the ancient history. In my Address, each of these kings has been allotted on the analogy of Toynbee 27 years on average, thus giving us 125 X 27 plus 591 or 3966 years BC as the date of Manu. The reason for accepting 27 on average as the length of reign for each king of historical tradition is that Toynbee in his 'Study of History, Vol. X, p. 172, describes how more than ten eminent Western scholars, though differing widely in regard to the dates of the beginning and end of the First Babylonian Dynasty, agree that 11 kings reigned for 300 years, i.e. each king reigned for 27.27 years on average. .27 years has been drafted and 27 years adopted as the average length of reign of left out Indo-Aryan king each...

"What M. Winternitz did (in his *History of Indian Literature*, Eng. tr. Vol.1, 1927) was nothing more than the fixing of the lowest limit. Winternitz considers that the placing of the R.gveda

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between 1200 BC and 1000 BC is hypothetical and arbitrary, and regrets that this notion "in the course of years, received more and more the dignity and character of a scientifically proved fact (p.293)." ..He considered 1200 to 1000 BC as the lowest limit...

"Among the documents found by Hugo Winckler in the excavations at Bogh'az Koi (Asia Minor) in 1907, some Hittite clay tablets were discovered recording treaties between Subbiluliuma, the king of Hittites, and Mattiurja, the king of Mitanni, dated about 1400 BC. The deities of both the nations are invoked as guardians of the treaties. The names of Mitra, Varun.a, Indra, and Na_satyas (i.e. the two As'vins) are found among the Mitanni deities. ila_ni mi-it-ra-as.-s.i-il ila_ni uru-w-na-as.-s.i-el (Variant) a-ru-na as.-s.i-il ilu in-dar ila_ni na_-s.a-a(t-ti-ia-a)-n.na (Variant) in-da-ra na_-s.(a)-at.ti-ia-an.na The discovery of the five Indian gods caused some perplexity among the scholars, specially because the names were grouped together in the same way as in the R.gveda. Jacobi states that the two groupings establish the Vedic origin and character of the deities which were adopted into the Mitanni pantheon. For this reason, any suggestion pointing to date the R.gveda later than about 1400 BC is an impossibility. (Winternitz, *History of Indian Literature*, vol.1, pp. 304-306). This view is accepted by Sten Konow, Hillerbrandt, and Winternitz. For the explanation of the association of the Vedic deities with those of Mitanni, Winternitz remarks that an assumption is necessary that just as there had been immigration of the Aryans into India from the West, so there must have been isolated migrations of the Aryans from India to the West. [To this may be added the names of In-tar-u-da or En-dar-u-ta in the el-Amarna letters; explained as 'beloved of Indra'.] [Note: The dethroning of Indra in the Avestan tradition and making Indra, a demon is an indication that the tradition has to be dated after ca.1400 BC, the date of the Mitanni treaty invoking Indra as a god, to witness the treaty].

"Astronomical evidence on the ageof the R.gveda. Scholars have attempted to establish the age of the R.gveda with the helpof astronomical evidence, collected from the R.gveda and other Vedic literature...Tilak calls the period from 5000 BC to 3000 BC the Orion Period, as during these 2000 years, the vernal equinox passed gradually from the commencement of the asterism Orion (Mr.gas'iras) to that of the next, viz. Pleiades (Kr.ttika_s).Many hymns of the R.gveda (including the Vr.s.a_kapi hymn) were in existence at that time...

"R.bhus are three in number -- R.bhu, Vibhva_ and Va_ja. They represent three seasons in a year recognised in the early Vedic period. (*S'atapatha Bra_hman.a* also mentions 3 divisions of the year: xiv.1.1.28)...

RV1.161.13: Oh R.bhus! you were asleep; thereafter ask Agohya, who is it that woke us up. The He-goat replied, 'the hound (s'va_nam) is the awakener'. As the year is passed, today you declare the same.

"...The spirits of the seasons stop work for 12 (intercalated for a lunar year) days and go to sleep. This period belongs neither to the old nor to the new year. It is therefore natural to hold that the hound is some constellation in the heavens, whose appearance indicated the beginning of the year. This hound is none other than the Dog-staror Canis Major. Thus, when the first of the seasons i.e. Vasanta appears, the Dog-star is found in the sky. 'In short, the whole story of the R.bhus, as we find it recorded in the R.gveda, directly establishes the fact that at the time when this legend was formed, the year commenced with the vernal equinox in Canis Major or Dog-star' (*The Orion*, p.169). The end of the year is the end of the three seasons here represented by the R.bhus...

"As the ancient Indo-Aryans converted the lunar year into a solar one by adding 12 days after a year of 354 days or one month (30 days) after two years and a half, the 366 days in the year contained an error of 3/4 day in each year...The six seasons have six presiding deities (A_dityas). The 7th A_ditya presides over the 7th season of one month. The number of A_dityas presiding over seasons is said to be 8...The 8th A_ditya is the presiding deity of one month that has to be thrown away after

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each 40 years. The fact is that if we admit that in each year 94 366 days an error of 3/4th of a day creeps in, we have also to admit that after 40 years the error becomes as big as one month (because 40X3/4 = 30 days)...The Indo-Aryans corrected the error by deducting one month from a year after every 40 years...Evidence of this correction is found in the following verse of the RV:

RV10.72.8-9: Eight sons (there were) of Aditi who were born from her body; she approached the gods with seven, but threw away Ma_rta_n.d.a. In a former yuga, Aditi went with seven sons, but she bore Ma_rta_n.d.a again for the sake of death. (ma_rta + an.d.a = dead egg).

RV 2.12.11: He, who discovered S'ambara dwelling in the mountains for forty years; who slew Ahi, growing in strength, and the sleeping son of Danu; he, men, is Indra.

(See Jogech Ch. Ray, *Veder Devata_ O Kr.s.t.ika_la* (Vedic gods and age of Vedic culture), 1954, pp. 88ff.)

"...The Vr.s.a_kapi hymn (RV 10.86), remarkable in many ways, may be cited as an evidence of the antiquity of the R.gveda...Vedic people offer new sacrifices to Vr.s.a_kapi. Indra_n.i_ takes this as an affront to her Lord and becomes very angry with Vr.s.a_kapi, who, she thinks, is responsible for all this mischief. She makes up her mind to punish him. She says that she will not be satisfied till she can set the Dog, eager for a chase of hog, on Vr.s.a_kapi (harito mr.gah, the yellow antelope) to bite him in ear, or behead the evil-doer...Vr.s.a_kapi is used to convey aspecial meaning viz. the sun at the autumnal equinox, with the Dog-star (a part of Mr.gas'iras) in the background, and the equinoctial year begins...

"A complete hymn of the R.gveda viz. 7.103 is devoted to the description and praise of the Frogs...Macdonell (*History of Sanskrit Literature*) thinks that 'the awakening of the frogs at the beginning of the rainy season is here described with a graphic power which will doubtless be appreciated best by those who have lived in India. The poet compares the din of this croaking with the chants of the priests exhilarated by Soma, and with the clamour of pupils at school repeating the words of their teacher'. (p.121)...three hymns (101 - 103) of the 7th man.d.ala of the R.gveda are all prayers to the god of the clouds (Parjanya) for shower of rain...Sa_yan.a following S'aunaka in the R.gvidha_na states that if prayer is made in the aforesaid manner, rain would surely fall on the 5th night...one word of the verse dva_das'asya

RV 7.103.9 They observe the sacred order, never forget the proper time of the TWELFTH (month), these men. As soon as in the year the raintime has come, the hot glow of the sun finds its end (Jacobi). They observe the sacred order of the YEAR, they never forget the proper time, those men, as soon as in the year of the rain-time has come, the hot glow of the sun finds its end (Keigi and Geldner).

"...Jacobi concludes that he has for the R.gveda 'a year beginning with rainy season, the most obvious and in general most regular division of time, from which the later Hindus called the Varsha_ or abda (= ap + da, rain-giving).' The first rain comes about the summer solstice...

"The Sam.vatsara Sattra or year-long sacrifice in the shape of gava_m ayana, a_ditya_na_m ayana, an:girasa_m ayana etc. occupied a very important place in the life of the ancient Indo-Aryan people...

"Taittiri_ya Sam.hita_ vii.4.8...Tilak translates :'...They should consecrate themselves for the sacrifice four days before the full-moon. Their KRAYA (i.e. the purchase of Soma) fallson the Eka_s.t.aka_. Thereby they do not render the Eka_s.t.aka_ void (i.e. of no consequence). Their SUTYA_ (i.e., the extraction of Soma juice) falls in the first (i.e., the bright) half (of the month). Their months (i.e., the monthly sacrifices fall in the first half. They rise (i.e. finish their sacrifice) in the first half. On their rising, herbs and plants riseafter them. After them rises the good fame that these sacrifices have prospered. Thereon all prosper.' (*The Orion*, pp. 46,47).

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NOTE: the purchase of Soma relates to the purchase of the electrum quartz ore. (The Avestan Haoma is not a mineral but a substitute: plant product; thus Avesta post-dates Taittiri_ya Sam.hita_; it will be elaborated elsewhere that CIKLI_TA_ in RV Khila_su_kta as the son of s'ri_ is in fact the 'purchased' soma, the son of Prosperity, S'ri_, mother goddess).

"...In one of the Adhikaran.as, Jaimini discusses the subject and decides in favour of the full-moon in the month of Ma_gha. (Jaimini-Su_tras, vi.5.30-30-37). Jaimini states that those who sacrifice on this full-moon day can purchase Soma on the Eka_s.t.aka_ which is no other than the one mentioned inthe beginning, and that the full-moon must, therefore, be the one next preceding this Eka_s.t.aka_. (*The Orion, p. 52*)...winter solstice fell in the month of Ma_gha...

"The tables of Naks.atras on the basis of the *Su_rya Siddha_nta*, ed. by Whitney, p.211, are appended by Jacobi to his article (p.159)...A reference to them shows that the vernal equinox was in the Kr.ttika_, and the summer solstice in Magha_ about 2500 BC...Jacobi states that the R.gveda, as a mature product, may belong to a later date...but he refers to the civilization as extending from about 4500 to 2500 BC, in the second half of which is to be placed the collection of hymns as they have come down to us...

"Buhler (IA, 1894, p.245) firmly holds that 'arrangement of Naks.atras with the Kr.ttika_s as the vernal equinox is an Indian invention'. He points out that the position of Kr.ttika_ at the vernal equinox was 'astronomically correct about 2550 BC.' (or 2350 BC according to Thibaut)...

"Some of the27 naks.atras arementioned with modified names in the R.gveda. They are: Arjuni_ (i.e. Phalguni_), Agha_ (i.e. Magha_),Tis.ya (i.e. Pus.ya_), Mr.ga (i.e.Mr.gas'iras) and Ahirbudhnya (i.e. Bha_drapada_)... RV10.85.2: Then Soma, the moon, is placed in the lap of the naks.atras...

"The Pole Star. Jacobi notes: 'The Gr.hyasu_tras tell us of a marriage-custom in sncient India, according to which the bride and bridegroom, after they had arrived at their new home, had to sit silently on the hide of a bull, till the stars became visible, whereupon the bridegroom showed his bride the Pole Star, called DHRUVA, 'the constant one', and at the same time uttered a prayer, as for example, 'Be constant, prospering in my house', whereto she replied: 'Constant art thou, may I be constant in the house of my husband'. This marriage-custom in which a 'constant star' figures as the symbol of unchangeable constancy, must have originated at a time in which a brighter star stood so near the celestial pole that it seemed, to the observers of that time, to be standing still. Now it is again a result of the precession that, with the gradual alteration of the celestial equator, its North Pole also moves away, describing in about 26,000 years a circle of 23 1/2 degrees radius around the constant pole of the ecliptic. By this means one star after another slowly moves towards the North Pole and becomes North Star or Pole Star; but only from time to time does a brighter star approach the Pole so closely, that it can, for all purposes be regarded as a 'constant one' (dhruva). At present (1927) Alpha, a star of the second magnitude, in the Little Bear, is the Pole Star of the Northern hemisphere...Not until 2780 BC do we meet with another Pole Star which merited this name. At that timne Alpha Draconis stood so near to the Pole for over 500 years that it must have appearted immovable to those who observed with the naked eye. We must, then, place the origin of the name of Dhruva_, as well as the custom of showing the 'constant' star to the bride on her marriage evening as the symbol of constancy, into a period in which Alpha Draconis was Pole Star, that is, in the first half of the third millenary BC.' "

Winternitz (History, p. 298) notes that the S'atapatha Bra_hman.a ii.1.2.3 (Sankar B. Dikshit in IA, 1895, pp. 245,246 translates: Certainly one, two, three, four: so (are) other naks.atras, and these only are many, which (are) Kr.ttika_h: surely (he who consecrates the sacred fires on Kr.ttika_h) gets that plenty of it; (one) should, therefore, consecrate (the sacred fires) on Kr.ttika_h. These, certainly, do not deviate from the eastern direction--eto ha vai pra_cyai dis'o na cyavante. All other naks.atras deviate from the eastern direction. His (two sacred fires) become consecrated in the very

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east. He should, therefore, consecrate (the fires) on Kr.ttika_h) has been wrongly interpreted as Pleiades 'do not swerve from the East', i.e. they rose 'due east' ('which would have been the case in the third millenary BC, and would point to a knowledge of hte vernal equinox'). He interprets the passage that 'they remain visible in the eastern region for a considerable time--during several hours--every night, which was the case about 1100 BC.' Winternitz credits Prey of Prague University for noting that 'about 1100 BC the Pleiades rose approximately 13 degrees to the north of the east point, approaching nearer and nearer the east line, and crossing it as late as 2 hr. 11 mn. after their rise, at a height of 29 degrees, when seen from a place situated at 25 degrees North latitude. They thus remain due east long enough to serve as a convenient basis for orientation'. Baudha_yana S'rautasu_tra 27.5 notes that Pleiades do not depart from the eastern region...According to Jogesh Chandra Ray, the Pleiades remained fixed, as it were, in that position for nearly seven or eight hundred years (3300 BC to 2500 BC), but that does not necessarily indicate that 3000 BC was the date of composition of S'Br. It was composed, according to Ray, within the range of 3300 BC and 2500 BC...
RV 1.26.4 Let Varun.a, Mitra, and Aryaman sit down upon our sacred grass, as they did at the sacrifice of Manus.
RV 9.96.12 As thou (SOMA) didst flow to Manu possessing food, slaying enemies, acquiring wealth, having oblations, so now flow bringing us riches; abide thou in Indra; make manifrest (thy) weapons. [The sacrifice as an institution was older than the R.gveda itself].
[Narendra Nath Law,1965, *Age of the Rigveda*, Calcutta, Firma K.L.Mukhopadhyaya].

[3] tibira, ‘coppersmith, metal-manufacturer’ and similar-sounding lexemes

Image: gimlet: tamar hole made by a gimlet; a borer, gimlet, drill (Ma.); tamar boring instrument; gimlet, spring awl (Ta.); tamiru gimlet (Tu.); tamire, tagire the pin in the middle of a yoke (Te.); tavar (-v-, -nt-) to bore a hole; *n.* hole in a board (Ta.)(DEDR 3078). tau~ri giddiness, dizziness (Ku.); tavar id. (M.)(CDIAL 5688). ta~v, tav, tava_ giddiness (M.)(CDIAL 5689). tavar to bore a hole (Tiv. Tiruva_y. 9,9,1); tamar hole, as in a plank, commonly bored or cut (Tiruvil.ai. Ma_n.ikka. 61) *Image: groove or mortise*: tavan.ai-p-poruttu a groove or mortise on the top of a gate or door-post (Ta.lex.) tamire = the pin the middle of a yoke (Te.lex.) tavan.ai joint, in carpentry (Ta.lex.) tavar = hole (Ta.lex.) tamar = hole, commonly bored or cut (Ta.Ma.)(Ta.lex.) tava_l.i-ttal = to make flutings or grooves, as in carpentry; to dig a channel; tala_l.ippu cavity in a moulding, groove (Ta.lex.) tavar-aiva_ri = handspike, a tool used on a ship; tavar-ai mu_t.t.a_n- = anchor chain; tavar-ai < dabara (Te.) capstan, machine for winding up a cable in small craft (Ka.lex.) tavan. = circle drawn with lime, or string tied around a limb, above the site of a poisonous bite with incantations to stop the spread of poison; tavan.ai = joint, as in carpentry (Ta.lex.) cf. ta_mare = ringworm (Ka.); ta_mara id. (Te.); ta_mra = a kind of leprosy with large red spots (Skt.)(DEDR 3164).

tavur, tavuruni to cut away any leaves or brushwood, to clear a bush (Ta.)

tavan.ai = raft or float for crossing rivers, especially one made of earthen pots and bamboos (Ta.lex.)

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tavan.ai-k-kat.ai = banking house of a na_t.t.ukko_t.t.ai cet.t.i; tavn.aikkan.akku periodical accounts of land-revenues (Ta.lex.)

tamar = doorway (Ta.lex.) [Note the arch ligatured to a spoked-wheel].

tavali = bull, white cattle (Ta.lex.)

tavali = a fish (Ta.lex.)

takar = male of makara, cur-a_, alligator (Ta.lex.)

takar = ya_l.i (Ta.lex.)

takar = elephant (Ta.lex.)

Tin ingot

touren~, tourea_ = a lump of tin (Kon.lex.) ta_bulu = a tinsel, brass leaf; the cuts, as of a precious stone; ta_bu_tu = the cage made of paper and tinsel by mussalmans at the moharam (Tu.lex.) tavara, tagara, tamara, tavaru = trapu, tin (Ka.lex.) cf. tamara = tagara, tin; lead (Ka.lex.) tamaramu, tavaramu = tin (Te.lex.) takaram tin, white lead, metal sheet, coated with tin (Ta.); tin, tinned iron plate (Ma.); tagarm tin (Ko.) tamaru, tamara, tavara id. (Ta.): tagaramu, tamaramu, tavaramu id. (Te.); t.agromi tin metal, alloy (Kuwi); tamara id. (Skt.)(DEDR 3001). trapu tin (AV.); tipu (Pali); tau, taua lead (Pkt.); tu~_ tin (P.); t.au zinc, pewter (Or.); taru_aum lead (OG.); tarvu~ (G.); tumba lead (Si.)(CDIAL 5992). **t.agara** = borax (VarBr.S); borax (Si.); t.agara, t.an:kan.a, t.an:gan.a, t.an:ka, t.an:ga (Skt.); dana_ka_r borax, alum (Kho.); tanga_r (Ir.Persian)(CDIAL 5437). tagad.u = a plate sheet leaf or foil; of metal (Te.lex.) tagara, tavara [Tbh. of tamara or trapu] tin (Ka.Te.Ta.M.)(Ka.lex.) Alloy: tara_ alloy of 8 parts of copper to 5 of tin, used for making metal vessels (pukar..tara_-p- po_kkillai) (Cine_n-. 169)(Ta.lex.) [The ligatured standard device can thus be explained as: tavaru san:gha_ta (lit. tin composite material), alloyed with tin or lead!] tamaram = lead (Kathirvelpil.l.ai Ta.lex.) tagad., tagd.a_ = tin, a sheet of tin (Kon.lex.)

tagat.u = gold lace; tagat.i = of gold lace; ornamented with gold lace (Te.lex.)

takaram = lead (Ta.lex.)

ta_val.am = a string or garland of beads, a rosary (Te.lex.) ta_vat.am = sacred elaeocarpus beads; necklace (Ta.lex.)

cf. tagori = potter’s wheel (Tu.)(DEDR 3200).

mer = (Hem.Des. mera_ fr. Skt. meru, name of a mountain) the largest bead in a rosary from which the reckoning begins (G.lex.) [Note the trefoil glyph on the uttari_yam worn by the priest; mer could be represented by a dotted circle, like a bead].

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taga_rum [Persian. taga_rah] a bricklayer's trough; a hod (G.lex.) tagar. = a trough; tagar.re surti ar cunko sipia = they mix surti and lime in a trough (Santali.lex.) taga_r = a tub, bucket, a trough, a platter, a mortar bed; taga_ri_ = a small tub, trough or bucket (P.lex.)

tagr.a = large, massive, strong (Santali.lex.)

t.agri han.d.i = pachwae, liquor made from rice, rice beer (Santali.lex.)

ten:gra hako = a species of river fish (Santali.lex.)

tagar = a flowering shrub (G.lex.)

[5] **Cultural history of Himalaya: Metallurgical heritage of Badrinath**

Badrinath is a pilgrimage centre of Bha_rata. With the auspiciousness associated with metal weapons and the protective significance of weapons which adorn the s'ilpa of mu_rti in all temples of Bha_rata and in the sculptures which are seen all over Bha_rata, it is a reasonable hypothesis that Badrinath was also connected with the Bronze Age and metallurgical traditions of Bha_rata.

Indeed, it was. South of Badrinath was a band of ancient workings of copper mines.

Western Garhwal is the region where River Sarasvati_ originated from the Svarga_rohin.i mountain range (Bandarpunch massif, close to Rupin and Supin glaciers and the tributaries of Sarasvati_: Rivers Tons (Tamasa) and Giri), and north of Paonta Saheb in Himachal Pradesh. (Paonta Saheb now has a 10 km dia. lake as a relic of the spot where Yamuna captured the waters of River Sarasvati_ to join the Gan:ga at Prayag, after linking up with River Chambal --Vais'ambhalya_, the nourisher of the vis').

"Jammu, Kashmir and Tibet. The areas which have major clusters of old workings are in the Banihal, Anantnag and Baramulla districts…In the Shomal area of Anantnag, the shafts are about 2m wide and 10 m deep while at Mamal, also in Anantnag, the hillside showed pits, generally 10m deep and 5m across. The old workings at Lashteal in Baramulla showed more complexity: the main shaft (1m wide) goes down for 3m, leveling off for about 5m to terminate in a room of about 10 cubic m. The shaft leading to it is about 2 m high. From the room-like space itself, a shaft (1m high) goes down steeply to come out of the side of the hill where the terrain is flatter and more accessible.

"Himachal Pradesh: Chalcopyrite and pyrite with some secondary chalcocite, malachite and azurite are spread along 13 km in the Shallu valley from Atoll to Batera in Simla district. The Chisani, Maol, Malanna, Kot Kandi, Chitrani, Shatgurh near Jerri and Kanor khad localities in Kulu showed copper, in addition to Narnaul and Danala where the mineralized zone extends for about 10 km in the Garsah valley, Uchih in the Parvati valley where pyrite and arsenopyrite occur at the **silver workings** and the Kulu Bijnar area where there are about 20 occurrences. In Sirmur, malachite stains were noted at Banal. Old workings with slag heaps have been noted in the Garsah valley, near Chisnai and in Sirmur (for the details, Raghunandan et al. 1981; Ball 1881).

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"Uttar Pradesh: Kumaun-Garhwal: The occurrence of copper in the rgion including such high altitude districts as Chamoli and Pithoragarh have long been known. Ball (1881) is informative in this regard, but the old copper mines of Kumaon are also discussed in GW Traill's (1828) 'statistical sketch of Kumaun' and in an account of JD Herbert's 'on the mineral productions of that part of the Himalya mountains, lying between the Sutlaj and the Kali (Gagra) rivers' (JD Herbert, 1932, repr. 1980, On the mineral production of this part of the Himalaya mountains lying between the Satlaj and the Kali (Gagra) Rivers…, *Asiatic Researches*, 18, New Delhi,, 227-58). The most detailed early account is by FJ Stephens (1901-02: 393-414) whose description of the old workings and preindustrial mining methods underlines the scale and nature of copper extraction and ore processing in different parts of Kumaon. According to Stephens, there were two types of ore in the region: irregular deposits worked extensively at Dhanpur, Dobri and Al-Agur, and regular nodes distributed from near Pithoragarh to the area south of Badrinath and beyond Pokri. This 50 mile long band is the major copper-bearing zone of the region, with localities like Rai, Bellar and Barabesi in Kumaun and Gwaldrum and Pokri in Garhwal being located here. At Dhobri, Stephens noticed many old workings which ramified to an extraordinary extent. The Dhanpur hillside where the formations dipped with the slop of the hill and thus provided easier facilities for mining was burrowed with holes. Situated on the western bank of the Ramganga, the Al-Agur deposit where some old workings went down to grat depths contained carbonate of copper and grey copper ore with a little pyrite. The other deposits included Tarag-ke-tal (10 miles north of Dwarrahath) and Goron (3 miles west of Pithagora) where the lodes were not rich but the old miners honeycombed them 'with holes like a rabbit warren, and taking out every particle of copper (FJ Stephens, 1901-02, Geology and mineral resources of Kumaon Garhwal, *Transactions of the Institution of Mining and Metallurgy*, X: 405). At Rai, Stephens noticed that 'the ancient miners must have gone down to a considerable depth, as every drive has more or less encountered unsuspected and masked old workings…the whole surface at Rai is honeycombed with irregular burrows of every description. In one of these, the remains of a skeleton partly impregnated with copper carbonate was discovered' (Stephens 1901-2: 409-10)." [Chakrabarti and Lahiri, 1996, pp. 14-15].

Pre-Harappan cultures. Aq Kupruk. "In Afghanistan, at Aq Kupruk (Dupree 1972; Shaffer 1978) the remains of an epipalaeolithic (last stage of Palaeolithic cultures) culture go back to c. 15,000 BCE, followed by a Neolithic culture with the evidence of domestication of sheep and goat. These Neolithic levels, without pottery, have provided two uncorrected (5730-half-life based) radiocarbon dates, viz. 8565+-240 BCE and 6960+-105 BCE (approximately 10,000-8,000 BCE calibrated). The subsequent ceramic bearing levels are dated by four dates viz., 5806 BCE, 5638 BCE, 5292/5286/5241 BCE and 3307-3110 BCE (Possehl 1990: 3-4). Thus, the beginning of the ceramic Neolithic, hence of pyrotechnology, in South Asia goes back to the sixth millennium BCE.

"Mundigak…(Period I) the most frequent metal artefact of the entire Mundigak sequence was a simple type of bronze point or punch with a circular cross-section…Frequently encountered utilitarian objects in Periods III-IV were small curved knives or sickles and chisels, and only in Period IV, a few barbed hooks. Three important metal artifacts located in Period III were the only examples of socket-hole axes (two) and an adze…Mehrgarh…The lowest levels of Mehrgarh, in area MR-3, yield a Neolithic culture with stone and bone tools: polished axes, adzes and chisels…Period III may be placed in the first half of the fourth millennium BCE…In Period III, fragments of crucibles with traces of melted copper, and **bun-shaped copper ingots** were also found…Period IV (c. 2800 BCE)…**A chisel, a flat axe and a double-spiral headed pin were the copper artifacts, as also compartmented seals, both in terracotta and stone**…Period VIII (mid-

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third millennium BCE)…The typically Harappan designs of **pipal-leaf, fish-scale and intersecting circles** had begun to appear in Period VII. The terracotta humped bull reminds one of the Harappan counterparts. The designs on terracotta seals include the **swastika, cruciform motifs** and what looks like **running animals**…Period VIII (contemporary with the late Harppan)…Bronze objects including a **shaft-hole axe**…Nausharo…6 km. South of Mehrgarh…Period II (first quarter of 3rd millennium BCE)…some pots bear characteristic signs of the Indus script…all structures of Period ID had been 'heavily burnt and the walls turned red due to heat' (Jarrige 1989: 64)…Damb Sadat…copper objects inclusive of a dagger, alabaster vessels, a compartmental seal, clay and shell bangles, bone and ivory beads…Nal, Kulli and Nindovari…faunal motifs include ibex, gazelle, zcorpion, fish, birds and humped bull…Mehi…cremation burials, the bones lying generally in urns…Nindowari…two seals with typical characters in the Harappan script with the unicorn motif…Rehman Dheri…ivory seal, with two holes…engraved two mountain goats, along with three symbols (c. 3000 BCE)…Sarai Khola…a dozen copper/bronze objects comprising spearheads, needles, nail-parers, antimony rods with rolled ends, pins, rings and bangles (mid-3rd millennium BCE)…Kot Diji…a fragmentary bronze bangle…Kalibangan…an axe, a paras'u and a bangle of copper/bronze…Banawali…an arrow-head and a fish-hook of copper…a stone weight (87.855 gms.)…Kunal…variety of ornaments in gold and silver. These include spiral bangles, 'crowns' and discular bead with axial perforation – all of silver and over twelve thousand beads…seven seals, six of steate and one of shell. These seals do bear motifs, mostly geometric, but no inscription." [DP Agrawal, 2000, *Ancient metal technology and archaeology of south Asia: a pan-Asian perspective*, New Delhi, Aryan books international, pp.57-68].

[6] *kut.t.am* depth, pond (Ta.); *kut.t.* a large pit (Kui); *kun.d.a* pit, round hole in ground for sacred fire (Skt.)(DEDR 1669). *kun.d.a* a reservoir of water surrounded with steps to go down to the bottom (G.) **ku~n.d.** a pit, a pitfall, a hot spring; norok ku~n.d. hell (Santali) kon.d., kon.d.a_, pit (Kon.); kun.d.a, kon.d.a = a hole in the ground, a pit (Ka.); kon.d.aban.d.i = a cart used at the kon.d.a feast; kon.d.ahabba = a feast in honour of Vi_rabhadra at which Lin:gavantas carry an idol of Vi_rabhadra and dance with it on live coals in a pit (Ka.); kun.d.a = a pit, especially of sacrificial fire; kon.d.a = a pit, hole; tu_takon.d.a = a fire-pit (Tu.); kon.d.upa_runi to run away with; kon.d.upo_pini = to take away, convey; kon.d.ubarpini = to bring; kon.d.opini, kon.opini id. (Tu.lex.)

[vii] **Upside down, birth**

put.t.ha = upside down, having the face downward (P.lex.)
put.t.u = birth, origin; progeny (Ka.)

Depicting kamar sa_la_ (blacksmith's workshop) or, 'saloi kamar' = a kind of blacksmith (perhaps, knife grinder) [**sala** = afterbirth, kamar]

[Note the glyph of a woman with spread thighs and something (placenta? menses? dead foetus?) emanating from the womb].

sa_l afterbirth (N.); cause of pain (G.); dead foetus in womb (M.); hal = afterbirth (K.); s'alya = anything lodged in the body and causing pain (applied to dead foetus)(Sus'r.); salla = thorn in body (Pkt.)(CDIAL 12332).

Some glyphs on Text 4304, rebus:

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Alternative 1: **kut.t.a_r, kut.a_r** = corn without grains (Go.); kut.t.a_ = chaff (Kur.)(DEDR 1665). kuta = jowari stubble (Go.); gut.t.u = stubble of paddy (Pe.)(DEDR 1676). *khut.t.a, *khun.t.a (CDIAL 3893, 3746). gundli = a cultivated millet, panicum miliare (Santali.lex.) Rebus: **kut.ha_ru** = armourer, writer (Skt.)

Alternative 2: **ko_li** a stubble of jo_l.a (Ka.); **ko_le** = a stub or stump of corn (Te.)(DEDR 2242). kol, kolhe = an aboriginal tribe of iron smelters speaking a language akin to that of the Santals (Santali.lex.) **kol** 'metal' (Ta.)

Pictorial motif on side b of tablet h180: a woman with legs spread out, accent on pubes: **kut.hi**; rebus: **kut.hi** = a furnace for smelting iron ore].

[viii] kasera_ worker in pewter (P.Bi.H.); kasero maker of brass pots (N.); ka_m.syaka_ra worker i bell-metal or barss (Ya_jn~.com.); kam.saka_ra (BrahmavP.); kasa_r = maker of brass pots (N.); ka~ha_r worker in bell-metal (A.); ka_sa_ri = pewterer, brazier, coppersmith (B.); ka~sa_ri_ (Or.); kasa_ri_ maker of brass pots (H.); ka~sa_ro, kasa_ro coppersmith (G.); ka~_sa_r, ka_sa_r worker in white metal; ka_sa_rd.a_ contemptuous term for worker in white metal (M.); kasau~r.i_ cooking pot (N.); ka~_sa_l.u~ large bell-metal cymbals (Or.); ka~_su~ bell-metal (OG.); ka~_sa_l. large cymbal (M.); ka~sa~_d.i_, ka_sa~d.i_ metal vessel of a particular kind (M.) kam.sa metal cup (AV.); bell-metal (Skt.); bronze dish (Pali); kan~jho bell-metal (S.); ka~_h gong (A.); ka~sa_ big pot of bell-metal (Or.); ka_so bell-metal tray for food, food (OMarw.); ka~_sa_ cymbals (G.); kaso_t. metal pot (Wot.); kam.sia_ a kind of musical instrument (Pkt.); kenzu clay or copper pot (K.); ka~_hi bell-metal dish (A.); ka~_si_ bell-metal cymbal (G.); ka~_siyo open bell-metal pan (G.) **kas-kut.** = metal alloy (brass or bronze) (N.) kan~cu = bell-metal, bronze, a hard alloy consisting usually of about three to four parts of copper to one of tin (Te.lex.) kan.sa_ro (cf. ka_m.sum fr. Skt. ka_m.sya bell-metal + ka_ra worker) a copper-smith (G.lex.) ka~_se~ bell- metal (M.); bronze (Kon.); ka_m.sya made of bell-metal (Ka_TyS'r.); bell-metal (Yajn~.); cup of bell-metal (MBh.); ka_m.syaka bell-metal (Skt.); kam.sa (?) bronze (Pali); bell-metal, drinking vessel, cyk bal (Pkt.); ka_sa id. (Pkt.); ka~_ja_ adj. of metal; ka_sa_ jar (L.); ka~_so bronze, pewter, white metal; kas-kut. metal alloy (N.); ka_h bell-metal (A.); ka~_sa_ (B.Or.Bi. Bhoj.H.); ka~sa_ (Or.); ka_s (Bhoj.); ka_s (H.); ka~_su~ (G.); kasa (Si.) ka~_iha~_ bell-metal (O.); ka~_ssi_, ka~_si_ (P.); ka~_si_ (H.)

[ix] *kasis* iron sulphate (Santali) *kaci* = scissors (Sh.); kocu = betelnut scissors (K.); kaciya_ = sickle (N.); ka_si (A.); ka_ci (B.); kacia_ = big scythe (Or.); kaciya_ toothed sickle (Bi.); kicca_ = cutting (Pkt.) *ka_yppu* hard inferior iron (Ga.); *ka_ypu* inferior iron (Ma.)(DEDR 1465). *ka_s* to be lit (as fire), burn; *kasis* to light (lamp, fire)(Kond.a); *kacay* id. to light (lamp)(Pe.); *hiccu kahinomi* we kindle fire (Kuwi)(DEDR 1090). kacan-ai censer (Ci_vaka. 2140)(Ta.lex.)

[x] **bod.e** = an inferior kind of han.d.i (liquor); bodoc mela, bod.oc sod.oc = the liquor obtained by squeezing the malted grain, and being refuse is of an inferior quality; bod.oc han.d.i = liquor obtained by pouring water on the malted grain and squeezing it (Santali.lex.)

[xi] **bari_** = blacksmith, artisan (Ash.)(CDIAL 9464). **bar.ae = bad.ae** (Santali.lex.) **bar.ae** = a blacksmith. “Although their physique, their language and their customs generally point to a Kolarian origin, they constitute a separate caste, which the Mundas consider as inferior to

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themselves, and the Baraes accept their position with good grace, the more so as no contempt is shown to them. …In every Munda village of some size there is at least one family of Baraes…The ordinary village smith is versed in the arts of iron-smelting, welding and tempering, and in his smithy, which is generally under one of the fine old large trees that form the stereotyped feature of the Mundari village, are forged from start to finish, all the weapons and the instruments and implements the Mundas require. There are of course individuals who succeed better than others in the making of arrows and various kinds of hunting-axes and these attract customers from other villages… they dig the **kut.i** (smelting furnace), they prepare and lay the bamboo tubes through which the air is driven from the bellows to the bottom of the furnace, they re-arrange the furnace after the lump of molten metal has been removed from it, and then the smith starts transforming it into ploughshares, hoes, yoking hooks and rings, arrow-heads, hunting axes of various shapes and sizes, wood axes, knives, his own implements, ladles, neat little pincers to extract thorns from hands and feet, needles for sewing mats and even razors. Formerly, he was also forging swords…susun-**kanda** (dancing-sword)…If it appears too bold to attribute the invention of iron smelting and working to some of the aboriginal inhabitants of this, in many respects so richly blessed part of India (Chota Nagpur), it is certain that no land in the world is better qualified to push man to this invention. The excavations made recently (in 1915) by Mr. Sarat Chandra Roy, the author of the *Mundas and their Country* have shown conclusively, that it was inhabited by man in the stone age, the copper age and the early iron age. Baraes are also found in the villages of Jashpur, Barwai, Biru, Nowagarh, Kolebira and Bano from which the Mundas have been either driven out by the Hindus or crowded out by the Uraons. There they have adopted the Sadani dialect but retained their own social and religious customs. In the districts named above they are called lohar or loha_ra, but in Gangpur they go under the name of Kamar. These Kamars are animists like the Lohars, but they use tanned hides for their single bellows, which they work by bulling, like the blacksmiths in Europe. The Lohars say that is is on account of this that they do not intermarry or eat with them any more. Baraes, Kamars and Lohars must not be confounded with the Aryan blacksmiths also called Lohars. These latter differ not only in race from the first but also in their methods of working. The Aryan blacksmith does not smelt iron, and uses only the single-nozzled hand bellows. He is met with only in such Chota Nagpur villages, where colonies of Hindu or Mohammedan landlords, merchants, money-lenders and native policement require his services, especially to get their bullocks and horses shod…The account the Baraes, Lohars and Kamars generally give of themselves is as follows: they say that they descend from Asura and Asurain, i.e., Asur and his wife, and that they were originally of one and the same caste with the Mundas. In this the Mundas agree with them… If the iron smelters and workers of the legend really belonged to the Munda race then their trade and art must in the beginning have given them a prominent position, such as is held in some ancient races by smiths…Like the Mundas they formerly burnt their dead, the bones of those dying out of their original village were carried back to it in a small earthen vessel into which some pice were placed, and this was then dashed to pieces against a rock in a river…Like the Mundas they practise ancestor worship in practically the same forms. Like them they worship Sin:bon:ga, whom the Lohars call Bhagwan… They also worship Baranda Buru whom the Sadani-speaking lohars call Bar Pahari…**bar.ae-ili** = the rice beer which has been brewed by the whole village, one pot per house, in honour of the Barae, and is drunk with him, at the end of the year; **bar.ae-kud.lam** = a country-made hoe, **bar.ae-mer.ed** = country-smelted iron; in contrast to **cala_ni mer.ed**, imported iron; **bar.ae-muruk** = the energy of a blacksmith.” (Mundari.lex., *Encyclopaedia Mundarica*, Vol. II, pp. 410-419).

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bar.hi, bar.hi_-mistri_, **bar.u_i_,** bar.u_i_-mistri_ (Sad.H. barha_i_) = a professional carpenter. This class of artisans is not found in purely Munda villages because every Munda knows carpentry enough for all his own purposes; trs. caus., to make somebody become a professional carpenter; intr., to call someone a carpenter; cina ka_m koko bar.hi_akoa? What kind of artisans are called carpenters; bar.hi-n rflx. v., to train oneself for, or to undertake, the work of a professional carpenter; bar.hi_-o, v., to become a professional carpenter; **bar.hi_ kami** = the work, the proession of carpenter, carpentry; bar.hi_-mistri_ a professional carpenter (Mundari.lex.)

bad.ohi = a worker in wood, a village carpenter; **bad.hor.ia** = expert in working in wood; bad.hoe = a carpenter, worker in wood; bad.horia = adj. Who works in wood; (as a scolding to children who use a carpenter's implements) mischievous (Santali.lex.) ba_r. blade of a khukri (N.); badhri_, badha_ru_ knife with a heavy blade for reaping with (Bi.); ba_r.h, ba_r. = edge of knife (H.); va_d.h (G.); ba_r.h = book-binders papercutter (Bi.); brdha_n.u_ = to sheer sheep (WPah.)(CDIAL 11371). vardha a cutting (Skt.); vad.hu a cut (S.)(CDIAL 11372). **vardh-** = to cut (Skt.); **vardhaka** carpenter (R.); bardog, bardox axe (Kho.); wadok (Kal.); wa_t. axe (Wg.); wa_t.ak (Pas'.)(CDIAL 11374). bad.gi, bad.gya_ carpenter (Kon.lex.) bad.hi, bar.hi mistri, bad.hoe, bad.ohi, kat. bad.hoe carpenter (Santali.lex.) bad.agi, bad.a_yi, bad.iga, bad.igi, bad.ige, bad.igya_, bad.d.agi (Tadbhava of vardhaki) a carpenter; bad.agitana carpentry (Ka.lex.) <u>Image: stick</u>: bar.ga, bar.iya stick (Kuwi); bur.ga stick, club; badga walking stick (Kuwi); bar.ga, bad.ga, bad.d.e, bad.d.i, bar.iya, war.iya_ stick (Go.); bar.iya stick (Pa.); vat.i small cane or stick; vat.ippu iron rod (Ta.); vat.i stick, staff, club or armed brahmans, shaft, stroke; vat.ikka to strike; vat.ippikka to have the measure struck (Ma.); bad.i, bad.e, bod.i, bod.e to beat, strike, thrash, bang, pound; <u>n</u>. beating, blow, castration, a short thick stick, cudgel; bad.ike beating; bad.ige stick, staff, cudgel, hammer, mallet; bad.isu to cause to beat; bad.ukatana beating, etc.; ba_y bad.i to prevent one from speaking, silence one (Ka.); bad.i (bad.ip-, bad.ic-) to hammer, pound; ba.y bad.i- to bawl out (Kod..); bad.ipuni, bad.iyuni to strike, beat, thrash; bad.u stick, cudgel (Tu.); bad.ita, bad.iya, bad.e thick stick, cudgel (Te.); bed.ta club; bad.ya walking stick (Kol.); bad.iga big walking stick; bad.ga stick (Kond.a); bad.ge stick, staff (Pe.); bad.ga stick (Mand..); bad.ga_ cudgel, stick; bad.vin.e~ to bruise, beat (M.)(DEDR 5224). **bharia** a carrying stick (Santali.lex.) vad.aga_ a stick, staff (M.); bad.iko_l a staff for striking, beating or pounding; bad.i-man.i an instrument for levelling a surface by beating; **bad.iho_ri** a gelded young bull (Ka.)(Ka.lex.) **vardhaka** =in cmpd. = cutting (Skt.); ci_vara-vad.d.haka = tailor; vad.d.haki = carpenter, building mason; vad.d.hai_ = carpenter (Pkt.); vad.d.haia = shoemaker (Pkt.); ba_d.ho_i_ = carpenter (WPah.); **ba_d.hi** (WPah.); **bar.hai**, bar.ahi (N.); ba_rai (A.); ba_r.ai, ba_r.ui (B.); bar.hai_, bar.ha_i, ba_r.hoi (Or.); bar.ahi_ (Bi.); bar.hai_ (Bhoj.); va_d.ha_ya_ (M.); vad.u-va_ (Si.); vardhaki carpenter (MBh.); vad.d.haki carpenter, building mason (Pali)(CDIAL 11375). vad.hin.i_ cutting (S.); vardhana cutting, slaughter (Mn.)(CDIAL 11377). vad.d.ha_pe_ti cuts (moustache)(Pali); badhem I cut, shear (Kal.); so_r-berde_k custom of cutting an infant's original hair (Kho.); bad.n.o_ to cut, (K.); vad.han.u (S.); vad.d.han. to cut, reap (L.); ba_d.hna_ to cut, shear (H.)(CDIAL 11381). va_d.ho carpenter (S.); va_d.d.hi_, ba_d.d.hi_ (P.)(CDIAL 11568). bed.i_r sledgehammer (Kho.); bad.il (Gaw.); bad.i_r (Bshk.); bad.hi_r axe (Phal.); sledgehammer (Phal.)(CDIAL 11385).

[xii] **bara_ha, barha_, ba_riha_, ba_ria_** boar (Or.); ba_ra_h (H.); vara_ (Si.); vara_ha wild boar (Pali.Pkt.RV.); vara_hu (RV.); bara_ boar (A.B.); sow, pig (A.)(CDIAL 11325). Vara_hamu_la name of a place in Kashmir (Ra_jat.); warahmul = a town at west end of the valey of Kashmir (K.)(CDIAL 11326). varaha (Tadbhava of vara_ha), varaha_, vara_ a boar, a hog; a gold coin with a boar-stamp, a pagoda (Ka.); ora, oraha boar (Tadbhava of varaha)(Ka.)(Ka.lex.) varaha_, varaha_si,

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vara_ boar, hog (Te.); vara_kan- (Ta.); vara_ha (Ma.); varaha_-kat.t.u a brush made of hog's bristle (Ka.); vara_kat.t.e (Te.); vara_ha a boar, a hog; the third or boar-incarnation of Vis.n.u; vara_ha-timmappa the Venkat.araman.a of Tirupati (Ka.)(Ka.lex.) vara_kam boar, swine (Tiruva_ca. 30); the boar-incarnation of Vis.n.u, one of taca_vata_ram; vara_kan- id.; pagoda, a gold coin = 3 1/2 rupees, as bearing the image of a boar; arhat; vara_kan-et.ai weight of a pagoda, a unit of weight = 5/16 rupee = 54 gms. (Ta.lex.) bir sukri the wild pig, sus indicus (Santali.lex.) a_ru hog (Skt.); airia_s. (Dm.)(CDIAL 1321). vara_ki va_ra_ki, a divine energy (Tiruppu. 179); vajra-vara_hi a godess worshipped by the Jains (Ta.lex.)

Homonyms for **bar.ea**:

bar.i-daru, **bar.e-daru** (Sad. bar.) *ficus bengalensis*, Linn. Urticaceae, the banyan, a tall, spreading rree with numerous aerial roots, which if not browsed by cattle, form new stems **bar.e**, variant of **bar.i**, the banyan tree; in songs it is bar.e, not bar.i which is used. (Mundari.lex.)

baria~o, ba~r.ia~ = a shopkeeper, a peddler who sells salt, spices, tobacco; baria~u = rich, great, powerful, arrogant (Santali.lex.) **van.ika** (Skt. Van.ik) a trader, a merchant; a grocer; a grain-vendor (G.lex.) va_n.iyo (Dh.Des. va_n.iyaya_ fr. Skt. va_n.iya-ka_ traders) = a Bania, an individual of a particular caste in Gujarat, the members of which are generally traders, shop-keepers, or money-lenders; a trader, a merchant; a dealer in grain (G.lex.) van.aja_r = a caravan; a camp or company of traveling merchants; a number of bullocks laden with corn, salt and other merchandise; van.ajaro = a traveling merchant who carries for sale goods in a caravan (G.lex.) van.ij = trader (RV); trade (Gaut.); van.i = trader (Pkt.); van.ic, va~r.ic = to sell (Ash.); vra_le (Kt.)(CDIAL 12230)

[xiii] Alternative: **kut.hi** = an earthenware barrel-shaped receptacle for storing paddy (Santali.lex.Bodding) **kut.hi** = a receptacle in which rice is stored (Santali.lex.) **kut.i** = a vessel with openings used for fumigations (Ka.lex.) **kun.d.i** = a student's water-pot, made of hollow coconut etc.; kun.d.ike, gun.d.ige = a waterpot (Ka.lex.) **kun.d.i_, kun.d.a_** = pot (Pkt.lex.) kun.d.a = bowl, waterpot (Ka_tyS'r.); basin of water (MBh.); kun.d.ika_ (Pa_n.); kut.am (Ta.); gun.d.i (Ka.); kunju = water jar (Pr.); kun.i = pot (Kt.); kun.d.o_k = wooden milk bowl (Kal.)(CDIAL 3264). kun.d.a = a spring (EI 23, IEG) gun.d.ige (Tbh. of kun.d.ike) = water vessel; gun.d.i = a large round earthen or metal vessel (Ka.); kun.d.i_ = a vessel of stone or earth (M.) (Ka.lex.) gun.d.iga = a large wide-mouthed vase or jar (Te.lex.) **kut.am** = waterpot, hub of a wheel (Ta.); kod.a = earthen pitcher or pot (Ka.); ku_t.a = waterpot (Skt.)(DEDR 1651; CDIAL 3227). **kud.aka** = a cup, a bowl, a small pan, any cup-like or concave thing (Te.lex.) **kut.amu** = a waterpot (Te.lex.) **kod.a** pot (Ka.) **kut.hi, kut.i** (Or. **kut.t.hi**) a mud walled store box for paddy, formerly sometimes found in the houses of Mundas (Mundari.lex.) **kut.t.akam** = cauldron, large vessel with narrow mouth (esp. for treasure)(Ma.); kut.t.uva = big copper pot for heating water (Kod.)(DEDR 1668). **kut.am** = waterpot (Ta.); kod.a = earthen pitcher or pot (Ka.); ku_t.a = waterpot (Skt.)(DEDR 1651; CDIAL 3227). ko_s.t.ha = pot (Kaus'.); granary, storeroom (MBh.); ko_s.t.haka = treasury (Skt.); ko_s.t.hika_ pan (Skt.)(CDIAL 3546). kut.hri_ chamber (B.); kot.hari ((Or.); kothla_ room, granary (H.); kot.hlo wooden box (G.)(CDIAL 3546). kotthali_ sack (Pali); kotthala = bag, grainstore (Pkt.); ku_thli_ satchel, wallet (B.); kuthal.i, kothal.i wallet, pouch (Or.); kothla_ bag, sack, stomach (H.); kothl.o large bag (G.); large sack, chamber of stomach (M.)(CDIAL 3511).

[xiv] Homonym: **ka~t.a** = a hook; **kat.a** = a pit saw (Santali.lex.) **kat.a kat.i** = cutting, to slash, kill; kat.ao = to cut (Santali.lex.); kat.aha = fierce, ravening; applied also to any cutting instrument used

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to kill an animal with; den, kat.aha odoktape, bring out your cutting instrument (to kill the goat with)(Santali.lex.) khat., khat. marte = with one blow, or with one cut; khat. menteye get topakkeda, he cut it right through with one blow; khar, khar marte = sharp[; to whish as when cutting with any sharp instrument (Santali.lex.) khad.u_ra = swing (AV 11.9.6) (Vedic.lex.)

[xv] If it is a skull, it could connote, man.t.ai = skull (Ta.)
man.d.a_ = warehouse, workshop (Kon.lex.)

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